ECONOMIC AND COMMERCIAL GEOGRAPHY

A STUDY OF THE WORLD'S ECONOMIC RESOURCES AND THEIR UTILISATION AND TRADE

By A. DAS GUPTA,

Professor of Business Administration ; University of Delhi ; Formerly Professor of Economic Geography and Commerce, Vidyasagar College, Calcutta

WITH MAPS, TABLES AND DIAGRAMS

A. MUKHERJEE & CO., PRIVATE LTD.
BANKIM CHATTERJEE STREET CALCUTTA

By the same Author—

"ECONOMIC GEOGRAPHY OF INDIA"

Revised Seventh Edition

PRICE Rs. 25·00 (Rupees Twenty Five onl

Thoroughly Revised

Published by N. Mukherjee, Managing Director, A. Mukherjee & Co
Private Ltd., 2 Bankim Chatterjee Street, Calcutta-12 and Volume
Printed by Prabhat Chandra Ray, Sri Gouranga Press Private
5, Chintamoni Das Lane, Calcutta-9 and Volume Two by Bholanath Ha
at Rupabani Press, 31 Biplabi Pulin Behari Das Street, Calcutta-9.

PREFACE TO THE REVISED EDITION

The 1972 edition of the book has come out with many anges in contents, and presentation of facts. In planning e contents, I have consulted the syllabuses of the Commerce urses of Universities and professional bodies. My intention not to write a comprehensive book on Economic Geography. y objective is rather to give emphasis on those aspects of onomic Geography which have their direct bearing on and levance to the production, distribution and utilisation of onomic resources in the different regions of the world. In ct the importance of such an emphasis has impelled some iversities in India to change the title of the subject to World Resources and Trade" or "Economic Development" or ndustrial Economy". Few Universities in their Commerce ourses do not place emphasis on economic resources and trade. his book is, therefore, principally concerned with the process economic development in terms of environment—physical d social. The book has presented facts for developing an derstanding of this issue. The general layout and design chapters, charts, diagrams, and tables are intended to stilate the thinking of pupils towards this objective. For data d informations, the latest publications of the Governments d United Nations organisations have been consulted.

I express my deep appreciation to my friends and students o have given me the benefit of their comments. I shall be ing in my duty if I do not express my grateful thanks to fessor A. B. Ghosh and Dr. M. P. Thakore of Delhi Uniity, Professor B. S. Bhir of Sri Ram College of Commerce Bombay and Dr. Paresh Chattopadhaya of the Institute of t and Works Accountants of India, Calcutta, for their helpsuggestions to make the book helpful from the point of of the university students.

A. DAS GUPTA

PREFACE TO THE FIRST EDITIO

ECONOMIC AND COMMERCIAL GEOGRAPHY has been written main to provide, in a small compass, the essentials of World Ec nomic Geography upon a topical-regional basis for students Commercial Geography in India. The book naturally divid itself into two parts. The first part deals with an outline the principles of Economic Geography; the second part d cribes the world, region by region. The book does not l any claim to originality except perhaps in the arrangement a method of presentation of the material and I must gratefu acknowledge my obligations to numerous periodicals and pu lications dealing with geographical matters for much of ma rial in the preparation of this book.

Dr. S. P. Chatterjee, M.Sc., Ph.D., D.Litt., F.G.S., Head the Department of Geography, Calcutta University, read t manuscript and offered most helpful suggestions for which I extremely grateful.

A. DAS GUP

Department of Geography,
Vidyasagar College,
Calcutta.

CONTENTS : VOLUME ONE

PART ONE: General Economic Geography

CHAPTER — PAGE

Introduction 1—7

Nature and Scope of Economic Geography ; Economic Geography—A study of a regions Resources and Trade ; Economic Geography and related fields of study ; Origin of Economic Geography. Purpose and Function of Economic Geography ; Methodology in the Study of Economic Geography. Conclusion, Questions.

I. Environmental Factors and Economic Activities 8—38

Environment and man's dynamism, physical environment, geographical location. Coastline, Role of Rivers, Influence of Mountains, Benefits from Mountains, Plains. Natural Resources, Economy of Forests, Importance of Soil, Oceans and Seas in Commerce, Climate on Economic activities, Shape and Size of a country, Cultural environment, Ethnic Groups and Commerce, Religions and Economic life, Government Attitude, Distribution of World Population. Questions.

II. Natural Regions, Stages of Economic Development and International Organisations 39—64

Natural Regions, Tropical Hotlands, Warm Temperate Lands, Cool Temperate Lands, Polar Regions, Stages of Economic Development, Development in Countries and Regions, Countries Grouped by Level of Economic Development, Developed and Underdeveloped Countries, International Organisations for Economic Growth, Impact on Underdeveloped countries. Questions.

III. World Agricultural Resources 65—150

Factors in agricultural development and Types of Agriculture, Cropping Systems, Plantation Crops, Agricultural Development and Population Growth, Chief Agricultural Resources, Distribution of World Cereals, Conditions of Growth, Trade in Wheat, Principal Growing Areas, Trend in Production and Commerce, Conditions of Growth, Growing Areas and Trade, Conditions of Growth and growing Areas, Trade in Barley, Oats, Growing Conditions, Areas and Trade. Rice, Trade in Rice, The Problems, Maize, Millet, Distribution of World's Beverages, Tea, World's Trade in Tea, Some Trends in Tea Consumption, Cocoa, Conditions of Growth, Geographical Distribution, World Trade in Cocoa, Coffee, Conditions of Growth, Geographical Distribution, Worlds Trade in Coffee, Problems in Coffee Trade, Tobacco, Conditions of Growth, Geographical Distribution, Trade in Tobacco, Sugar, Fruits and Spices, Sago, Arrowroot, Degree of Self-

PAGE

Sufficiency in Food, Increasing Population and Food grains Position, Distribution of World Fibre Crops, Cotton, Jute, Hard Fibres, Hemp, Flax; Plantation Rubber and Oilseeds, Plantation Rubber, Oilseed for Vegetable Oil, Questions.

IV. World's Mineral Resources 151—217
General Consideration, Classification of Minerals, Metallic Ores and their Distribution, Gold, Gold Deposits in North America, Silver, Silver Deposits in North America, Silver Deposits in other Areas, Platinum, Lead, Geographical Distribution, Manganese Ore, Trade in Manganese, Zinc, Copper Ore, Aluminium, Tin, Mercury or Quick Silver, Iron, Economic Factors in Iron Ore Production, Iron Producing Areas—U.S.A., United Kingdom, France, Soviet Russia, Trade in Iron Ore, Iron Reserves, Mineral Fuels and Water Power—Coal, Petroleum, Reserves, Use of oils, The Leading Producers, Soviet Russia, Venezuela, Rumania, Middle East: The Greatest Oil Producing Region, Oil Fields in Asia, Pattern of Petroleum Trade and Seven Majors, Conservation of Petroleum, Future Trends, Natural Gas, Water Power, Geographical Conditions and Modern Adjustments, Hydro-Electric Development, Conditions of Water-Power Development in India, World Hydro-Electric Capacity, Conflicts between Purposes, Some Non-metals, Sulphur, Salt, Graphite, Asbestos, Mica, Precious Stones, Ruby and Sapphires, Building Stones. Questions.

V. Fisheries, Animals and Forests as Resources ... 218—243
The Fishery Resources, Principal Fishing Grounds, Present Position, Exploitation and Conservation, Animals as a Source of Food and Raw Materials, Animal as a Source of Food; Cattle and Food Supply, Dairing, Animals as a Source of Raw Materials, Wool, Trade in Wool, Some By-products of Animals, Forest Resources and Forestry, Forest—A Multipurpose Resource, Types of Forest, Forest Regions—Europe—North America, Asia; Forests of India, Pakistan and Bangladesh, Some Problems of Forestry. Questions.

VI. Industrialisation and Industries 244—323
Factors in Location of Industries, Man-Power in the Growth and Development of Industries, Conclusion, Typical Manufacturing Industries in the World—The Iron & Steel Industry, Causes of Location and Concentration, Crude Steel Production, Iron and Steel Industry in U.S.A., Causes of Growth, Sources of Iron Ore, Centres of Steel Production, Markets for Iron and Steel of the U.S.A., Iron and Steel in U.S.S.R., Causes of Growth, Areas of Production, Markets for U.S.S.R. Steel, Problems, Iron and Steel in West Germany, Causes of Growth, The Areas of Production, Iron and Steel in Japan, Causes of Growth, The Area of Production, Iron and Steel Production in Britain, Sources of Iron Ore, Range of Production, Areas of Production, Markets of British Steel Products,

PAGE

Iron and Steel Production in India, History of Revival of the Steel Industry, Causes of Growth, Sources of Raw Materials, Areas of Steel Production, Range of Products, Problems, Markets Abroad, Iron and Steel in other Countries—Canada—France—Brazil, Leading Engineering Industries—U.S.A., U.K., U.S.S.R., West Germany, Aircraft Manufactures, Location Factors, Aircraft Manufacturing Countries, U.S.A., U.S.S.R., United Kingdom, India, Automobile Industry,—U.S.A., U.K., France, other Producing Areas, Prospects in India, Shipbuilding, The Leading Shipbuilding Countries—Japan, Causes of Growth—West Germany, Britain, Other Shipbuilding Countries—Sweden, Shipbuilding in India, Problem of Shipbuilding, The Aluminium Industry, The Uses of Alminium, Production, Producing Countries—U.S.A., U.S.S.R., Canada, other Producers of Aluminium—Japan, West Germany, Australia, Position of India, Conclusion, Textile Fabrics, Cotton Manufactures and Distribution, Cotton Textiles in Britain, Growth Factors, Characteristics and Distribution, Characteristics of Textile town in Lancashire, Present Position, Cotton Textiles in the U.S.A., Areas of Production and their Characteristics, Specialisation by Product, Trade in U.S. Textiles, Cotton Textiles in Japan, Causes of Growth, Cotton Textile Industry in India, Causes of Growth, Causes of Growth in Bombay, Cotton Textile Areas in India, Present Position in Trade, Some Problems in the Industry, Wool Textile Industry, Classification of Wool, The Principal Producing Areas, Woollen Industry in U.S.A.—Problems, U.K.'s Woollen Industry, Present Trends, Woollen Industry in India, Silk and Silk Industry—France, U.S.A., The Silk Industry in India, Rayon Textile Industry—The U.S.A., Japan, U.K., India, Sugar Industry, Cane Sugar, Cuba, Australia, Mauritius, Sugar Industry in India, Beet Sugar, Rubber Manufactures and Synthetic Rubber, Synthetic Rubber, Miscellaneous Manufacturing Industries, Cement Manufacture, Paper, Chemical Industries, Questions.

VII. TRANSPORTATION 324—362

Modern Development of Roads and Motorways, Rail Roads, Some Important Trans-Continental Railways—The Trans-Siberian Railways—The Trans-Caspian Railway—The Canadian-Pacific Railway—The Chile-Argentina Railway—National Rail Roads, Railroads in U.S.A., Rail Roads in Canada, Rail Roads in Europe, Rail Roads in Asia, Water Transport, River Systems of Europe, Asia, Africa, Australia, North America and South America, River-Transport in Australia, River Transport in Canada and U.S.A., River Transport in South America, River Transport in Africa, River Transport in Asia, Ocean Transport, The Principal ocean Routes of the World, Canals and Ship

PAGE

Canals, The Suez Canal, The Canal Route, Advantage of the Canal, Problems of the Suez Canal, Recent Development, The Panama Canal, Economic Advantages of the Panama, Characteristics of the Panama Canal, The Problem of the Panama, Some other important Canals—The Kiel Canal, The Manchester Ship Canal, Great Lakes—St. Lawrence Sea Canal, Air-Transport, Some Special Features, Air Traffic in some Countries, The International Air-Routes of the World. Questions.

VIII. DEVELOPMENT OF PORTS AND HARBOURS 365—380
The characteristics of a Port—Harbour, An Essential Factor in a Port Accommodation, Importance of a Port, Kinds of Port, Bulk Cargoes and Super Ports, Entrepots and Free Ports, Some Important Ports, Cities and Trade Centres, Conditions favouring the growth of Cities. Questions.

IX. WORLD COMMERCE 381—428
Difficulties in World Commerce ; Some Geographical Facts of World Commerce, Advantages of World Commerce, Common Market, European Economic Community, New Members, The Problems of EEC, Tariffs and other forms of Trade Control, World division and World Commerce ; Developing Countries' trade in primary commodities ; Balance of Trade ; The Foreign Trade and Commerce in U.S.A. Foreign Trade of Japan; Direction of Japan's Foreign Trade, West Germany, U.S.S.R., Canada, Great Britain, Some General considerations about the British Foreign Trade, The Pattern of India's Foreign Trade, Characteristics of Imports, Predominance of Capital Goods and related Items, Slow Decline in the import of Raw Materials and Intermediate Goods, Dependence on Imported Food Grains, Geographical distribution of Imports, Commodity-wise Sellers, India's Trade Relation with Certain Important Countries, the United Kingdom, U.S.S.R., Burma, Ceylon, Japan, West Germany, United States of America, Afro-Asian Region, India's Trade Agreements, Inter Regional Trade. Questions.

PART TWO: REGIONAL ECONOMIC GEOGRAPHY

X. EUROPE 429—52
Causes of Europe's Greatness, Some Deficiencies of Europe, Unoin of Soviet Socialist Republics, Geographical and Political Features, Economic Development through Series of Five-Year Plans, State Farming and Collectivisation, Principal Agricultural Crops, Mineral Products of U.S.S.R. Forests and Fisheries, Manufactures and Industrial Zones. Union of Soviet Socialist Republics. The United Kingdom of Great Britain and Northern Ireland, Economic and Human Factors in U.K.'s Growth. Manufacturing Industries and Industrial Regions, Cotton Mill Industry, Present Position. Iron and Steel Industries. The Producing Regions, The Automobile Industry, Ship Building, The

PAGE

Woollen Industry, The Leather Industry, Transport, Foreign Trade and Commerce of Great Britain, The Important Commercial and Industrial Centres and Ports. Germany, France, Switzerland, The Netherlands (Holland), Belgium, Denmark, Norway, Sweden, Italy, Yugoslavia, Hungary, Austria, Czechoslovakia, Rumania, Poland, Finland, Greece (Hellas), Spain, Portugal, Bulgaria, Albania. Questions.

XI. North and Central America 523—551
General consideration. Canada, Economic Resources and Industries. Forests and Forest Products, Transportation, Manufactures and Industrial Regions, Commerce and Trade, Cities and Ports. The United States of America, Factors responsible for greatness, Population Characteristics, Agricultural Products, The Minerals, Manufactures and Industrial Regions. Transportation—Foreign Trade and Commerce—Trade Centres and Ports. Mexico. Questions.

XII. South America 552—567
The Problems and Economic Life of South America. Colombia, Venezuela, Ecuador, Bolivia, Chile, Brazil, Argentina, Uruguay, Peru, Questions.

XIII. Africa 568—588
General consideration. Agricultural and Mineral Production, Economic Surveys of some African Countries—Republic of Nigeria, Ghana, Uganda, Kenya, Tanzania, Malawi, Zambia, Rhodesia, Somali Republic, the Sudan, the Republic of South Africa. United Arab Republic (Egypt), Ethiopia and Eritrea. Algeria and Tunisia. Questions.

XIV. Australia & New Zealand 589—599

XV. Asia 600—648
General consideration. Japan—Causes of Japan's Progress, The Resources and Industries, Forests in Japan, Fishing, Mineral Resources, The Manufacturing Industries—The Textile Industry—Iron and Steel Industry—Foreign Trade—Trade Centres and Ports. Korea (Chosen), People's Republic of China (Mainland), Transport, Population, Resources of China, Foreign Trade of China, Ports and Trade Centres, Taiwan, The Philippines, Thailand, Malaysia, Singapore, Democratic Republic of Viet-nam, Republic of Viet-Nam, Cambodia and Laos. The Republic of Indonesia. The Near and Middle East, Syrian Region, Iran, Israel, Iraq, Afghanistan, Arabia, Bahrein, Saudi Arabia, Asia's Turkey or Anatolia. Questions.

VOLUME TWO

CHAPTER PAGE

XVI. PART THREE: REPUBLIC OF INDIA 3—236

Introduction, The Natural Divisions of India, The Climatic Characteristics, Soil and Soil Regions, Problem of Soil Erosion, The Population Characteristics, Racial Background, Languages, Agriculture and Agricultural Products, India and her food supply, Rice, Wheat, Millets, Joar, Bajra, Barley, Maize, Pulses, Tea, Coffee, Tobacco, Sugarcane, Jute, Mesta, Cotton, Oil-seeds, Linseed, Mustard and Rape Seed, Groundnut, Sesamum, Castorseed, Coconut, Natural Rubber, Irrigation Works and Multipurpose Projects, River disputes for Sharing Advantages, Indus Waters Treaty, The Multipurpose Valley Projects, Damodar Valley Corporation Project, other River Valley Project, Forests and their Products, Importance of Forest, Forest Products, Developments and Problems, Some Important Commercial Timbers, Animal Husbandry Dairy and Milk Supply, The Fisheries, Development of Fisheries in States, Some Problems in Fisheries, Mineral Resources, Defficiency in Base Metals, Conservation of Minerals, Iron Ore, Manganese, Copper, Gold, Mica, Salt, Salt Petre, Silver, Chromite, Antimony, Tungsten, Gypsum, Graphite, Asbestos, Diamond, The Sources of Power in India, Power Prospects in India, Coal, Consumption of Coal, Petroleum, The Development of Hydro-electricity, Principal Manufacturing Industries and Industrial Areas, Some Important Public Sector Industries, Industrial Regions, The Cotton Textile Industry, Cotton Manufacturing Areas, Markets and Problems, The Jute Mill Industry, Export of Jute Products, Some Problems of Jute Industry, The Sugar Industry, Tea Factories, The Sericulture Industry, Woollen Industry, The Iron and Steel Industry, The Centres of Production, Pattern and Rrange of Production, Import and Export of Steel, Engineering Industries, Paper Making in India, Chemical and Allied Industries, Glass and Ceramic Industry, Aluminium Industry, Leather Industry, The Ship Building Industry, Aircraft Manufacturer, Automobile and Ancillary Industry, Lac Industry, The Cement Industry, Location of Cement Factories, Match Industry, Small-Scale and Village Industry, Facilities of Transportation, Railways, Road Transport, Importance of Roads in India's Economy, Plans and Problems, The Frontier Routes, Inland Navigation, Shipping and Sea Routes, Principal Shipping Routes, Development of Air Transport, India's

CHAPTER		PAGE
	overseas Air Route Pattern, Foreign Trade of India, Sources of Imports by Sea, Air and Land, Exports by Commodities by Sea, Air and Land, Exports by Countries, Some Broad Characteristics in India's Foreign Trades, Towns and Ports, Some Important Towns with Population of 100000 and over, Principal Ports, The Principal Ports on the Western Coast of India, Bedi Bandar, Kandla, Bombay, Mormugao, Cochin, The Principal Ports on the Eastern Coast of India, Tuticorin, Madras, Visakhapatnam, Calcutta, Trade Centres. Question.	
XVII.	PART FOUR: NEIGHBOURS OF INDIA. PAKISTAN .. Natural Regions, Agriculture, Mineral Products, Coal, Petroleum, Natural Gas, Water Power, Live-Stock Population, Fisheries, Manufacturers, Facilities of Transportation, Inland Water Transport, Civil Aviation, Ports and Trade Centres, Foreign Trade. Question.	237—260
XVIII.	BANGLADESH General Consideration, Natural Regions, Floods and Irrigation, Problems in Agriculture, Forests, Minerals, Fruit Production, Livestock, Fisheries, Manufactures Jute Mills, Cotton Mills, Sugar Factories, Woollen Industries, Transport, Civil Aviation, Ports, Trade Centres, Foreign Trade, Composition of Exports from Pakistan to Bangladesh, Composition of Exports from Bangladesh to Visakhapatnam, Calcutta, Trade Centres. Questions.	261—277
XIX.		
	BURMA	278—283
	CEYLON	284—286
	NEPAL	287—288
	SELECTED BIBLIOGRAPHY	289—292

VOLUME ONE

Fig. No.		Page
1.	The Cradles of Civilisation	13
2.	Countries with Low Density	32
3.	Level of Economic Development	35
4.	Cultivated Areas of the World	68
5.	World Production of Principal Agricultural Crops ...	70
6.	Wheat area and Production, 1970	73
7.	Export of Wheat	78
8.	Note the decline in India, Brazil and Egypt and the average in U.K., West Germany and Japan	79
9.	Rye-Area and Production	84
10.	Rye trade Export	85
11.	Barley: Area and Production	87
12.	Import of Barley	89
13.	Export of Barley	89
14.	Oats: Area and Production	90
15.	Rice (Paddy): Area and Production	95
16.	Rice: Export and Import	96
17.	Maize: Area and Production	101
18.	Tea Production	105
19.	Coffee Production	113
20.	External Trade in Coffee	117
21.	Raw Jute and Allied Fibres	137
22.	Natural Rubber Production	144
23.	World—Gold Production	155
24.	World—Silver Production	159
25.	Trend in World Production of Manganese	164
26.	World Zinc Ore Production	167
27.	World Copper Production	168
28.	Copper Consumption	170
29.	World Production of Tin	173
30.	Production of Iron Ore—1969	178
31.	World Coal Production	186
32.	Production of Coal	188
33.	Oil—Total Discovered	192
34.	Crude Petroleum Production	194
35.	Production of Crude Petroleum	195
36.	Middle East Oil	198
37.	World Fish Catches	222
38.	Wool Production	233
39.	World Pig Iron and Ferro Alloys Production	249
40.	Crude Steel Production	251
41.	Crude Steel Production in U.S.A.	255
42.	Growth of Steel Production in the USSR and the USA ...	256
43.	Soviet Union—Pig Iron & Ferro Alloys Production ...	258
44.	Production of Pig-Iron 1964 to 1970	262
45.	Motor Vehicles: World Production	277
46.	World Production of Merchant Vessels	279
47.	Ship Building Countries, 1967	281
48.	World Consumption of the Apparel Fibres	289
49.	The Suez Canal	345
50.	The Traffic Flow of Rotterdam	371
51.	World Trade Exports and Imports	383
52.	U.S. External Trade	393
53.	Foreign Trade of Japan	396

Fig. No.		Page
54.	Trade of U.S.S.R.	400
55.	India's Foreign Trade	408
56.	Imports Broad Commodity Groups	418
57.	Indo-British Trade	422
58.	Trade with U.S.S.R.	422
59.	Indo-Japan Trade	424
60.	Indo-German Trade	425
61.	Indo-U.S.A. Trade	426
62.	Production of Crude Petroleum—U.S.S.R.	441
63.	The Cotton Manufacturing Towns of South Lancashire	463
64.	Crude Steel Production	466
65.	Foreign Trade of France	487
66.	Foreign Trade of Italy	507
67.	Mineral Production—Canada	527
68.	Production of Crude Petroleum	528
69.	Location of Buenos Aires	564
70.	South Africa and World Gold Production	581
71.	Foreign Trade of Australia	595
72.	Japan—Index of Production	612
73.	Production of Pig-Iron	614
74.	Production of Crude Petroleum	638

VOLUME TWO

Fig. No.		Page
75.	Growth of Population in India between 1951 and 1969	18
76.	Land Utilization	24
77.	India—Agricultural Production—1970-71	28
78.	India—Production of Cereals—1970-71	30
79.	India—Rice Production	34
80.	Note the Gradual Increase in the Average yield per acre Plan period-wise	36
81.	Plan Period-wise Increase in the Average yield of wheat per Acre	38
82.	India—Wheat Production	40
83.	Production of Tea	43
84.	Acreage and Production of Tobacco in India	49
85.	Acreage and Production of Jute in India	54
86.	Damodar Valley Project	76
87.	Nangal Bhakra Projects	80
88.	Iron Ore Production	107
89.	India—Production of Coal	122
90.	Lignite Production	123
91.	Production of Cotton Cloth	138
92.	Production of Cotton yarn	139
93.	Production of Cotton Yarn and Cotton cloth	141
94.	Jute Mill Centres	147
95.	Jute Textile Production	148
96.	Production of Sugar	152
97.	Production and Export of Tea	156
98.	Production of Woollen & Worsted	161
99.	Production of Iron and Steel	163
100.	Paper and Paper Board Production	170
101.	India—Aluminium Production	179
102.	Automobiles Production	184
103.	Production of Cement	189
104.	India—Imports	214
105.	India—Progress of Traffic	220

INTRODUCTION

NATURE AND SCOPE OF ECONOMIC GEOGRAPHY

Economic Geography—A study of a region's Resources and Trade

Economic Geography is a systematic study of the *economic resources and their utilisation as developed by men* within limits set by the physical and social environment of a *place*. It is not just a study of the effect of physical factors on the distribution of resources but is also simultaneously concerned with the understanding of the economy of a region and the manner in which its various forces merge into a single producing system.

The geographical factors play their part in helping a country to be a great power, but the resultant economy that emerges is due to the efforts of her people. Countries having more or less similar physical environment do not always develop identical economy because the people are different in tradition, outlook, ideas and technological practices.

The pivotal factor in Economic Geography is *man* in a *place* and in a particular *period*. It narrates about his efforts—conscious and planned—to utilise natural forces of the place in a given *period* for production and distribution of resources in the interest of his society. Since the economy of a region does not remain the same, but changes according to its people's knowledge, skill and competence, Economic Geography must have to be very dynamic in approach. This need for dynamism in approach demands a shift in emphasis from physical to social environment. Not that physical environment is to be ignored, but it is to be viewed and examined in the context of the changing forces of the social environment.

Physical environment of a region is considered by many as the more important aspect of the subject than human factors in understanding efforts to develop resources and their distribution. J. McFarlane emphasises the influence of physical environment and defines Economic Geography as "the study of influence exerted on the economic activities of man by his

physical environment, and more specially by the form and structure of the surface of the land, the climatic conditions which prevail upon it, and the place relations in which its different regions stand to one another".[1] So much weight on physical environment to explain the human efforts for economic development of a region detracts the central theme—that is, stages in the activities of men for the development of resources. Then again, the extent to which physical environment influences and controls human activities differs from time to time and from region to region. In the earlier times, man's activities were no doubt the direct result of his physical environment, but today, with greater knowledge of science and technology, he is less dependent on this factor. Naturally, therefore, one cannot get an adequate interpretation for the pattern of economic activities by a study of the relationships with physical environment alone.

However, one cannot overlook the integrated character of the subject.[2] The corpus of knowledge in Economic Geography is built up from contributions of many disciplines like physical geography, political science, economics, sociology and commerce. This integrated character of Economic Geography has given scope for changing the emphasis of the contributions from different disciplines in terms of their importance at a particular point of time in a country.

Economic Geography and related fields of study

Certain specified aspects of social sciences and of physical geography constitute a framework for the study of Economic Geography. Naturally, the related disciplines are interested in the analysis and findings of Economic Geography so as to avoid duplication of efforts or keeping a gap in the understanding of many vital factors about economic activities. There is a large area common to both Economics and Economic Geography. Since Economics is a study of certain distinct activities in which

[1] J. McFarlane: Economic Geography, Pitman & Sons, London, 1937.

[2] Gregory and Keller were the first to consider commercial geography and physical geography as an integrated study as early as 1910. See Physical and Commercial Geography, by Gregory, H. E. and Keller, A. G. (1910, Ginn).

en and society decide about employment of resources today
id in the future, its concern with value, utility, finance, bank-
g, taxation, exchange and credit is of main importance.
:onomic Geography has taken up the things produced and
e places and conditions of their production and use. Because
:onomic Geography traverses a large area of economic activities,
ere will be always an inescapable tendency for Economic
eography to overlap with Economics and many other social
iences for the search for interpretations.

Such inter-disciplinary dependence is quite common for all
anches of social science for broader knowledge and deeper
iderstanding of the social forces. Economic Geography is no
ception. Such dependence on a particular discipline does not
cessarily make Economic Geography a branch of that disci-
ine. Economic Geography is not geography. Nor is it Eco-
s. Yet Economic Geography will touch intimately many
these areas. This truth is often blurred by the assertion one
akes because of one's larger concern for one particular disci-
ine. Renner and others think that Economic Geography is
specialised branch of Geography, and its function is to explain
e relationship between two sets of data—one from Economics
l related fields and the other from physiographic science and
er contiguous fields of knowledge.[3] They, however, do not
plain why it should not be considered a branch of Economics,
a from which are equally important. Thatcher also holds
view that Economic Geography is a branch of Geography,
t Anthropogeography and historical geography along with
ional geography lead up to the final study, Economic Geo-
phy, and that it starts where regional and anthropological
graphy leaves off.[4] The history of Economic Geography,
wever, does not indicate that it has been developed that way.

Origin of Economic Geography

Economic Geography owes its growth as an academic
cipline to stimulate the interest of the British people in com-
rce. It is interesting to note that Chisholm, the father of

[3] Renner, Durand, White and Gibson, op. cit., p. 4.
[4] Thatcher, W. S. : Economic Geography, English Universities Press,
ndon, 1949, p. 23.

modern Economic Geography, wanted *an intellectual interest the study of geographical facts relating to commerce.* He thoug that the primary use of Economic Geography is *"to form sor reasonable estimate of the future course of commercial develc ment* so far as that is governed by geographical conditions In his treatment of the subject, however, Chisholm emphasis commercial development, and considered the physical featu and climate in relation to resources mainly. This emphasis physical features and climate in relation to *resources* led oth subsequently to think of Economic Geography in terms of pr ductive occupations. Jones and Darkenwald[6] state th Economic Geography deals with the productive occupatio and that it attemps to explain why some regions are o standing in the production and distribution of certain *artic* and why others are significant in the importation and utilizati of these products. Ellsworth Huntington, however, consid that all sorts of materials, resources, activities, customs, capabi ties and types of ability that play a part in the *work of gettir a living* are the subject matter of Economic Geograph "Farming, manufacturing and trade are the main methods getting a living. Hence Economic Geography combines thr phases—agricultural, industrial and commercial, but minin lumbering and fishing must also be considered." Its areas are resources and their utilization by men in a region for gettir a living. This emphasis on the work of getting a living shared by Shaw also, and he suggests that this should be in context of industries, resources and commodities.[8]

Purpose and function of Economic Geography

The main function of Economic Geography is to provid acquaintance with the economic construction of a country or region. This, in its turn, means (*a*) to know the natural cond tions and natural resources of a country as a whole, and ea of its large regions taken separately ; (*b*) to know the econor

[5] Chisholm's Handbook of Commercial Geography, written by L. Stamp and Gilmour : Longmans, Green & Co., 1954, p. 16.
[6] Jones and Darkenwald : Economic Geography, MacMillan & New York, 1950.
[7] Ellsworth Huntington: Principles of Economic Geography, p. 1.
[8] E. B. Shaw : World Economic Geography, John Wiley & New York, 1955, p. 4.

nherited by a country from its past ; (*c*) to know the course of onstruction, as well as its current tasks both in a country as whole and in each large region taken separately ; (*d*) to know id comprehend how various branches of economy are com- ined into a single co-ordinated whole, how different branches pply each other raw materials, fuel, subsidiary materials and quipment, how they supplement each other, merging into a ngle producing system.[9]

The purpose of Economic Geography is to analyse the causes f the gap between nations—developed and developing and to arch for measures that will create a rational world trading nvironment in which there can be multinational collaboration nd international transfer of skills.

Economic Geography as a study highlights a frame of think- ig regarding world resources and trade in terms of world conomic partnership, free from exploitation of one by another.

There is much disparities in the economic progress of the fferent countries in the world. Apart from the fact that the overty and slow progress of the developing countries mean a nsiderable strain on the developed countries because of the rmer's constant requirements for aid and assistance from the ter, the gap in respect of economic development itself is a rrier to international understanding and co-operation. Each untry can reduce its gap if its problems relating to resources id trade are examined and analysed in terms of its static and namic factors of environment, and plans and programmes are ade for economic growth. The examinations and analysis will veal not only strong and weak factors but also the scope for ternational co-operation. Economic and commercial Geo- aphy can also provide a tool to examine and analyse the oblems.

Methodology in the Study of Economic Geography

There are three recognised methods or approaches to nomic Geography: *Regional Approach, Commodity proach,* and *Principles Approach.*

[9] Adapted from Baransky's Economic Geography of the U.S.S.R., reign Language Publishing House, Moscow, 1956, preface.

Regional approach aims at studying the economy of different geographical regions in a country, a continent or the world. Regional review of a country has become a popular approach in Economic Geography. If one has to get an intelligent appreciation of the economy of a country, regional approach is indispensable. Regions are sometimes taken as political divisions within a continent or in the world. Whatever be the basis of a region—political or geographic, the approach emphasizes physical environment, population, natural resources, manufactures, transportation and commerce.

In commodity approach, the resources which help men to attain economic development are described and analysed with the facts of Economics and the facts of environment to assess their degree of utilization in various regions or countries of the world. The approach may consider individual products in the context of man's mastery of industrial difficulties. Commodity approach *par se* is very wide as it attempts at giving intimate acquaintance with the industrial stages and processes in respect of commodities which also must take into account regional characteristics.

The third one is the principles approach, where universal generalizations are established about man and his environment on the basis of analysis of facts at a particular point of time for explaining the economic activities. The generalizations or principles are expressed in prescriptive form: "Plains invite occupancy, mountains repel settlement" or "Deserts are regions of privation". While many facts about a country can be explained by applying principles, it is extremely doubtful if the approach can ever become effective for understanding all facts of economic activities in different regions. A principle which is also concerned with human behaviour in the economic sphere can hardly be universal in its application in view of the differences in social, political and economic set-up of the countries from time to time. Many modifications of a principle are to be considered, and in the process the force of the principle is bound to disappear. At best, this approach can strengthen the powers of reasoning and analysis.

It may be mentioned that no particular approach can be relied upon for explaining all aspects of Economic Geography. For example, the principles approach is followed in the inter-

pretation of the environmental factors ; resources need commodity approach, and the political units require a synthesis of all the approaches. Each approach however recognises the basic fact that economic activities are the *sine qua non* of the subject.

Conclusion

Economic Geography develops an understanding of the conditions and problems relating to the production and utilisation of the economic resources through analysis of the static and dynamic factors of environment in a country or region so as to stimulate one's interest in the plans and development programmes for economic growth. This understanding, analytical ability and interest lead to better appreciation of not only a country's economic problems but also of problems between nations. Viewed thus, Economic Geography is a tool for understanding and interpreting certain factors of economic growth and its study is a kind of training in the use of such a tool.

QUESTIONS

1. "Economic Geography has been called a dynamic geography: its pivotal factor is man in a place." Discuss this statement and show the scope and function of Economic Geography. (Delhi B. Com. 1963)
2. Explain the purpose and scope of Economic Geography. What are the sources from which it draws its data and information ?
3. It is said that the function of economic geography is "to impart an intellectual interest to the study of geographical facts relating to commerce". Explain how this intellectual interest can help commerce. (Delhi, B. Com. 1964)
4. Define the nature and scope of Economic Geography. In what ways is Economic Geography different from Economics ? (Delhi, B.Com. 1969)
5. Explain how economic Geography is related to other branches of geography. (I.I. Bankers 1971)
6. Write an essay on the scope and usefulness of Economic and Commercial Geography. (Delhi B.Com. 1971)

CHAPTER I

ENVIRONMENTAL FACTORS AND ECONOMIC ACTIVITIES

Environment and man's dynamism

Today different countries are at different stages of economic development. Some countries are very advanced: some are on the way to industrialization and many are still backward. These different stages in the economic development explain the disparities in the standard of living that exist in the world today. The differences in economic activities may be partly explained by an analysis of the correlation between man and his environment. The physical environment does not, however, absolutely determine the character of economic life; but, it does exercise a control over it which is more apparent in the earlier stages of human history. Man cannot be totally indifferent to nature and its role in influencing his activities. Also, man is not a passive agent to resign himself to the limitations of his physical surroundings. He has the capacity and power to mould his environment to meet his needs. In an advanced civilization where man has learnt to respond to his environment and to obtain from it an increased benefit, its impact is less real. Environment offers a range of possibilities within certain limits. Man's ability in choosing the alternatives from all possibilities of the environment and working them to his advantage will depend upon his dynamism reflected in his knowledge, intelligence and culture as well as on the social structure of the country he lives in.

The actual production of wealth and the degree of economic progress in a country are the result not only of human ability and effort operating within the limits set by the physical environment but also of the social environment. In a society where people are very much dominated by mores and beliefs of families, groups or communities, new ideas and practices will

not be readily acceptable.[1] In such a society, an individual has a surrendering attitude and one does not feel like challenging the constraints in the society. Consequently, the qualities of self-reliance, self-confidence and initiative for achieving a goal do not find scope for their effective development. When the social environment is such that it encourages innovation in industry and changes in attitudes the opportunities of physical environment will be best utilized. The policies of the government of a country may be sound; the government may initiate programmes, demanding modernisation in science, technology and management; International organisations may give all possible assistance in money, equipment and expertise; collaborative arrangements may be made with foreign firms or governments for development programmes. Yet the performance of the country can be shockingly poor if the willingness of the people for bringing change is absent. The physical features are the static elements of the people and their culture, the government, ideas, abilities, skills and group motivations. Both the static and dynamic elements are in operation to prepare the mode of life of a people in any region.

PHYSICAL ENVIRONMENT

The physical environment of a country consists of those factors of nature which remain static so as to form a distinct framework of their own within which the people are to live, work and advance. These factors are its location, coast-line, rivers, topography, shape and size, minerals, forests, soil and vegetation.

Geographical Location

The geographical location is a matter of fundamental importance in the commercial development of a region. Geographical location is not a fixed concept. Changes in the pattern and direction of trade routes as well as development in

[1] Though every society has some aspects of its traditional behaviour, the main consideration is whether challenge of change—social, technological or political, is accepted by its people.

the surrounding areas can give new significance to a region.[2] The location of a place or a country may be of any of the following types—continental, littoral, isthmian, insular and peninsular. The location is continental, when a country is in the heart of a continent or when it is land-locked. Although such a country has the advantage of developing trade with the surrounding countries, so far as seaborne commerce is concerned, the location is a disadvantage. Afghanistan, Poland, Bolivia and Czechoslovakia afford examples of *continental* location. The important sea routes of the world are far off from the countries. A *littoral* location shows that a considerable strip of land is by the side of the sea. The importance of the littoral location will depend on the navigable character of the sea or ocean. A littoral location is enjoyed by Norway, Sweden, France and Spain from where the world's routes are marginally accessible. The British Isles, Japan, Italy, India and Newfoundland possess *insular-peninsular* locations which make access to the seas almost by all sides of a country. The principal trade routes of the world are openly accessible to them.

Location of a country is said to be favourable when it *possesses natural frontiers and a climate favourable for human settlements and is in close proximity to the world markets with proper facilities for the movement of goods and persons.* Frontiers are important from the point of view of defence, commerce and nationality. There are two types of frontiers—natural and artificial. Natural frontiers are seas, mountains, deserts, swamps and rivers, which make foreign aggression difficult and breed a spirit of independence within the country.[3] The frontiers of the British Isles, there being seas on all sides, are more easily defended from hostile attack and are not liable to change due to wars and political revolutions. A change in the boundary means a change in the territorial area as well, reducing or increasing

[2] Notwithstanding the presence of the Arctic ocean to the north, the Soviet Union was thought to be occupying a continental location because the Arctic ocean did not function as a sea route in the past. Thanks to the development of engineering and technology, the Soviet Union has made the Arctic ocean an important shipping line between West Europe and the Far East. Although regular sailings are confined to summer months, the volume of traffic is on the increase at a phenomenal rate.

[3] A natural frontier by itself cannot defend a country unless it can be used as such by the people in terms of its accessibility to send supplies and soldiers from within.

the natural resources to be obtained. In Europe, where desert frontiers are absent, the use of the river as a political frontier is very common. The following are some of the examples ; (*i*) the Middle Rhine separates France from Germany ; (*ii*) the Middle Danube separates Hungary from Czechoslovakia ; (*iii*) The Drave separates Hungary from Yugoslavia, and (*iv*) the Lower Danube separates Rumania from Bulgaria. Rivers, however, do not always make good frontiers between countries because the crossings are easy.

Artificial frontier means a frontier which is not marked by clear-cut geographical features like mountains, deserts, etc., and is determined by historical circumstances, agreements, treaties or wars. The frontiers of Poland, Czechoslovakia, Rumania, etc., are artificial, and, therefore, these are frequently affected by political changes. Between 1938 and 1948 there have been great changes in the frontiers of many European countries like Germany, Poland, U.S.S.R. and Italy.

Britain furnishes an example of a country whose position in the centre of the world has greatly contributed to the growth of her foreign trade. No part of the commercial world is too far from her and she is provided with proper facilities for the movement of goods and persons. Similarly, India, at the centre of the Eastern Hemisphere and with her three sides open for sea-navigation, is situated admirably for commerce. The location of Japan in the Pacific Ocean is also as favourable as that of British Isles in the western hemisphere. The location of the U.S.A. though remote from the Old World is geographically highly favourable for commerce as both the eastern and western sides are facing the oceans which are the two very important highways. In fact, the U.S.A. is like a great world island to which access from all countries of the world is possible for trade, and yet sufficiently secure in the strategic sense.

It may be noted that since the frontiers of a country are the limits of its boundary, and since the boundary of a country is not a fixed phenomenon, the presence or absence of a natural frontier is a matter of chance.

The most important element in human progress is the contact of many cultures. Hence a location which invites contact and provides easy access to and from other regions will promote material and cultural advancements.

It is easy for a country, situated in the vicinity of industrial areas, to develop trade and commerce. Italy was once a backward country ; but since the nineteenth century she has implemented industrial ideas, inspiration and technical processes from the neighbouring industrial countries, and has thus become a powerful industrial country. Similarly, the location of the youngest State of the World—Bangladesh, at the head of Bay of Bengal and by the eastern side of India with no physical barrier between them, holds out great promise in terms of economic development.

Coast-line. *The nature of the coast-line is another geographical factor in the development of sea-borne trade.*[4] All countries having littoral, peninsular or insular locations have sea-coasts. The coast-line, which plays an important part in promoting or retarding the development of an area, may be of various types—smooth, high, low and broken. To be of commercial service, it should be irregular, that is, broken, so that the sea may reach far inland. By minimizing the violence of the waves, affording protection to vessels and allowing them to reach far into the interior, a broken coast-line makes possible the development of harbours and ports, and consequently contributes to the easy exchange of commodities and the growth of industry and commerce. In Great Britain, which has a largely indented coast-line and where no part of the country is more than a hundred miles off from the sea, the cost of getting exports to the sea is reduced to the minimum and the expense of shipping imports from one port of the island to any other is correspondingly small. The commercial greatness of Netherlands is partly the result of her broken coasts. In fact, the coasts made the Dutch essentially a commercial nation. By their constant association with the sea, the Dutch have become sea-faring, adventurous and enterprising. A country may not, however, take advantage of the indented coast-line for commerce. Greece has a broken coast-line and in ancient times the Greeks were a sea-faring and commercial people. The modern Greeks, however, have not so far fully utilized the advantage

[4] A coast-line is the whole extent of a country's sea coast. Naturally, a coast-line may present different characteristics in the same country—shallow, deep, broken or unbroken. It may also consist of steep and high cliffs. Special names are given to different portions of sea coast of a region like the Malabar coast and the Coromandal coast in India.

that Nature has given them. The coast-line of Norway, though very much broken, consists in many places of high and steep mountain walls and, therefore, it does not present "opportunities of collecting produce for shipment or for disposing of incoming cargoes".

When the coast-line of a country is regular or high, there will not be many ports and harbours. The coast-line of India is not generally favourable to the construction of numerous ports and harbours, inasmuch as most parts of the western margin are regular and open to the violence of the monsoon and the eastern side is generally surf-bound. As a result there are only a few major ports.

Role of Rivers

Of all factors of physical environment none has played a more important role than rivers in helping man's progress and civilization through navigation, irrigation and power. From the

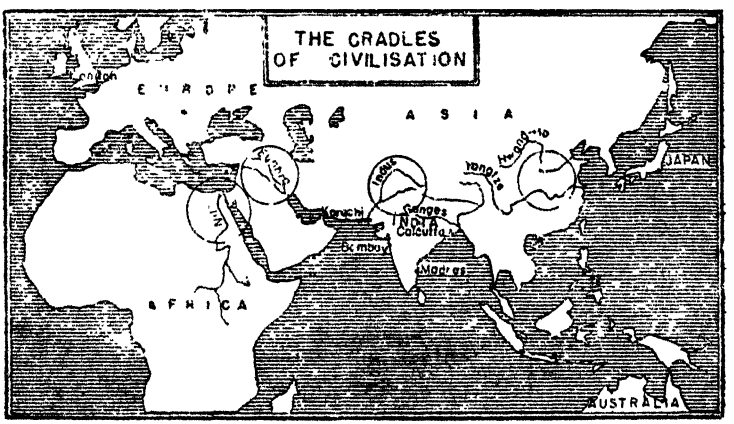


FIG. No. 1. The cradles of civilisation. The valleys of the Nile, Ganges, Hwang-ho and Tigris present favourable geographical conditions for the growth of civilization. These conditions are the fertility of soil, natural protection and climate.

earliest times of human history, men preferred river valleys for settlement to other areas. The four great river-valleys—the valleys of the Nile, the Tigris-Euphrates, the Indus-Ganges, and the Hwang-ho-Yangtze are the cradles of civilization. Rivers

are natural transporting agents; they are essential for the distribution and exchange of goods. The direction of a river is determined by the relief—mountains, hills and plains—of a region. The direction towards an open sea makes a river more important for commerce. If it flows to an inland sea or Arctic region, the use of it for transport becomes restricted. To be useful as transporting agents, rivers should possess certain physical characteristics: (1) they should be free from ice, for, if they are ice-bound during winter the traffic is suspended; (2) they should be deep enough to allow steamers and barges to ply; (3) they should not have rapids and falls; and (4) they should not get dry during summer.

So far as shallowness of a river is concerned, it can be deepened or its depth can be stabilized by the use of a dam. In recent years, such a practice of constructing dams is becoming more common with the development of multi-purpose projections.

Rivers can be either fed by the melted snow or by rain-water. The snow-fed rivers have, in general, constant flow of water although volume of water is larger in summer than in winter. Rain-fed rivers have water during the rainy season only. The rivers of Northern India—the Sutlej, the Jumna, the Ganga and the Brahmaputra—are snow-fed, and provide highways of commerce and add to the wealth of the vast plain intersected by them. Several thousand kms of canals and channels have been constructed by building dams across these rivers to supply water to millions of hectares of land. The rivers of Southern India, on the other hand, are rain-fed and dry up when the rainy season is over unless controlled by dams. They pose problems for navigation though they are useful for generating hydro-electricity.

Apart from their importance as transporting agents, rivers have other uses too. Water for industrial and domestic purposes perhaps ranks first in the list of economic benefits from rivers. They also fertilize the valleys through which they flow. All kinds of vegetation and economic products grow on the river plains. The rivers of Bangladesh supply soil, manure, moisture and highways of carriage for all the wealth of the State to a degree not yet achieved anywhere in the world by any river system. Many countries would have remained agriculturally

backward had there been no rivers. The Nile has made Egypt the granary of Africa, where wheat, cotton, fruits, barley and tobacco are cultivated extensively. Without the Nile, Egypt could not have developed her commercial agriculture. The Nile brings down from Abyssinia fertilizing mud and provides the means of irrigation. During the rainy season the Nile rises up by many feet and embankments have been constructed to check its flood. The water of the Nile is distributed throughout the region by canals to provide perennial irrigation for the cultivation of summer crops. Egypt is, therefore, considered as the gift of the Nile.

In spite of the benefits, rivers may also cause considerable damage by floods, and not even man's scientific ingenuity can do anything to bring about complete prevention of floods except reasonable protection at an enormous expense.

A river can flow through a number of States, and water rights become a matter of law and agreement. Every state has a right to ordinary use of water in any quantity. If, however, water is not plentiful in the river and the need for it is equally great in another state towards which the river flows, disputes are likely to arise over the question of developing irrigation facilities through canals. In such a situation, agreements are made by the states concerned about the nature of use.

Mountains have considerable effect on the economic development of a country.[5] *Mountains, as a rule, restrict settlement greatly.* High, rugged mountains impose tremendous handicaps upon the movement of people, the spread of population and the building of roads and railways. As human activities are generally restricted in regions where mountains dominate the land forms, the population in such regions is comparatively sparse. Agriculture is difficult because of the scarcity of level land, erosion of soil, difficulty of using modern machinery for large-scale cultivation and the scattered location of the fields. Manufacturing industries also are beset with many obstacles like poor facilities for transportation, and great

[5] The distinction between mountain and hill is often an arbitrary one. The mountains have higher heights than hills—yet the hills of a region may be twice the height of mountains of another region; cf. the Nilgiri Hills and the mountains of Great Britain.

distance from consuming markets. In fact, difficulties of transportation have their impact on the nature of economic activities which men will carry on in such regions. The dwellers in mountains have, therefore, generally a standard of living lower than that of the people of the plains. The extent to which industrial activities of a mountainous region can be developed will also depend on how its inhabitants overcome the natural impediments by their own skills of engineering and science.

Yet mountains offer great benefits in certain distinct ways. First, in many countries they are responsible for causing rainfall ; they influence the climate by keeping off winds or by condensing them. The Himalayas protect India from the severe cold winds of the North during winter, and during summer they cause rainfall by capturing moisture-bearing South-West winds. Secondly, mountains are usually the sources of rivers. For, it is the mountains that receive large amounts of precipitation as snow or rain, and, as a result, many of the rivers of the world have their sources in mountains. In Europe, the Alps is the chief source of most of the rivers which collect in innumerable valleys and flow to all parts of Europe. All the rivers of India have their sources in the mountains and hills. Thirdly, mountains afford valuable pastoral grounds. Practically in all mountainous regions of the temperate zone, grazing and stock-raising are the mainstay of thousands of people dealing in dairy products. Fourthly, they are responsible for the growth of forests on the slopes, which offer varieties of raw materials for many industries. The forest regions of the world are mostly located in the mountains. Fifthly, they are sometimes great store-houses of mineral wealth. The igneous and metamorphic rocks in the mountains contain copper, gold, silver, lead, zinc and other metals. The rocks of younger formation in the mountains contain petroleum, coal, chalk and sands. In Canada, U.S.A., Mexico and U.S.S.R., many productive mines lie in mountainous regions. Sixthly, many mountains offer magnificent scenery and have become noted as recreational areas. Switzerland, Norway, Canada and India are examples. In the tropics the mountains make excellent pleasure and health resorts, particularly during the hottest months. The refreshing air and the beautiful scenery of mountains attract a large number of people from the plains in summer.

Finally, mountains cause waterfalls from which water-power is obtained for the generation of electricity for industrial purposes. Norway, Sweden, Austria, Spain, Switzerland and Italy are obvious examples where hydro-electricity has been developed because of the existence of many hill-streams and falls.

It is, therefore, no exaggeration to say that "the influence which mountains exert on man and his activities is one of the most positive of geographical forces." The water and air in the mountains being pure and wholesome, the mountain people have better health and greater energy than the inhabitants of the plains. The mountain people are generally conservative, for being detached from outside influences they adhere to their old customs and practices. But they are industrious because of the hard life they are to lead in the presence of physical environment. In recent years the development of communications has, to a large extent, removed the isolation of many mountain regions and brought the inhabitants into closer touch with the world outside. The mountains, however, do not produce a common pattern of attitude and way of life for their inhabitants. The inhabitants of mountainous Switzerland developed a vigorous pacifist attitude in their industrial society; the inhabitants of mountainous Afghanistan developed a vigorous militaristic society; the inhabitants of mountainous Tibet developed a feeble hermit society.[6]

Plains

Although plains occupy about one-half of the earth's surface, they are the home of more than 90 p.c. of the people of the world.[7] Plains, when they are not deserts or swamp lands, are densely populated, because people usually settle on them as long as space is available. The economic activities of man are the greatest on the plains, due to many advantages available there. The levelness of relief facilitates agriculture and transportation. The principal agricultural belts of the world

[6] Pearcy, Fifield and others: Political Geography, Constable & Co., London, 1951, p. 1.

[7] Plains are also called lowland plain, upland plain and highland plain. The land between sea-level and 600 feet are lowland plain; between 600 ft. and 2000 ft., upland and above 2000 ft highland.

are all confined to plains where temperature and soil do not vary suddenly. The ease of mobility on plains also facilitates the exchange of goods and ideas. Railway lines are easily constructed, and more than 85 p.c. of the world's railway mileage is found on the plains. The rivers in the plains have slow current which is essential for navigation. The Rhine, the Elbe, the Rhone, the Danube, the Dneiper and the Don in Europe; the Mississippi in the U.S.A.; the Ganga and the Brahmaputra in India and Bangladesh and the Indus in Pakistan flow through gentle gradients of the plains, and are, therefore, easily navigable. Thus in agriculture, manufacturing, transportation and trade the greatest development has taken place on the plains. Nearly all the great cities of the world are on the plains.

All plains may not be equally hospitable to human settlement. People do not like to settle on lowlands which have bad climate, poor drainage and unproductive soil. Adverse climate can negative all other advantages of the plains. "Some plains are too dry, others too hot, while still others are too cold for human occupation." The Congo, the Amazon basin, the Sahara and the Tundra are thinly populated, although these are plains.

Broadly speaking, the influence which a plain exerts is permissive, and the differences in the nature of activities are mainly due to differences in soil, climate, resources and location.

Natural Resources

The important role played by natural resources in determining the economic life of a nation can hardly be exaggerated. Natural resources in a narrow sense are those uncaptured natural stores which are useful to mankind in any way. They are commonly grouped as soil, forests, grassland, aquatic fauna, animal life and minerals. As natural resources, soils and forests are replaceable and maintainable while minerals are irreplaceable.

One of the most significant events about natural resources in the present day is the change in man's thinking in respect of their conservation. To preserve is not always conservation. While, in the case of irreplaceable resources, conservation means *judicious use to reserve for future needs*, it is not so in the case

of many replaceable resources. One cannot preserve fish indefinitely, because surplus will perish naturally, and it must be harvested each season. To use is to conserve—and that is imperative in many cases as in water resources. Many regions have been industrially developed in course of exploiting mineral products. Also, mineral resources play a big part in the economy of a country where these are raised. South Africa is a prominent example. Gold is abundant there and its development has given rise to many subsidiary industries in the country. "Gold mines are the backbone of South Africa" because the growth of population and the development of industries have come in the wake of mining industry. As the minerals are irreplaceable, men always think of new discovery of mines, and of the use of substitutes so that mineral shortage may not thereaten the economy. But these steps are not enough. Men must conserve not necessarily for the future by non-use in the present, but by promoting avoidance of waste in mining and preparation.

The UN Economic and Social Council has formulated in January 1972 a programme for setting up of a UN Natural Resources Exploration Fund. The fund is to be raised by the developed countries. The idea is to plough back a part of the revenues gained from UN-aided resource development into further exploration in a unique self-help programme. The fund will help developed and developing countries alike for exploration of natural resources in the world.

Economy of Forests

The forests of a country play a vital role in its general welfare and development.[8] Forests are important sources for timber, fuel and other products which are used for domestic and industrial purposes. In the forest regions, the main industry of the people is lumbering; many other industries depend on wood as a source of raw materials. The forest areas of Norway and Sweden are large; boat-building, paper and match-making

[8] "The forest is a national resource; like a river system, it is a multiple-purpose resource; it constitutes a social asset of the first magnitude."—R. W. Zimmermann in World Resources and Industries (Harper & Bros., New York, 1951).

and furniture industries have grown out of the plentiful trees available there. The fur-bearing animals of Canada are abundant in the forest region of the Hudson Bay; they are trapped and killed for their pelts. The influence of forests on climate is also far-reaching. They arrest the moisture-bearing winds and cause rainfall and as such they are very important to countries where agriculture is the chief industry. The productivity of forests, however, depends considerably upon the way its benefits are reaped by men. A continuing flow of these benefits dictates skilful, scientific management, so that depleting forces like fire, insects, disease, overcutting and waste in utilization are held in check.

Importance of Soil

One of the most indispensable natural assets is soil. Soil is the term applied to the loose earthly layer which normally covers the solid rocks of the earth's crust. Chemically, the soil is the source of the majority of those elements which are essential to the life of plants. These elements are calcium, magnesium, sulphur, iron, nitrogen, potassium and phosphorus. The soil is not only a storehouse of these materials, but is also like a factory with a continuous output of plant food. Our food and clothing and most of our shelter are derived directly or indirectly from soil. Agriculture is normally the basic industry in fertile regions. The presence of fertile soil has made agriculture an important source of wealth in India, China and the U.S.A.

Soil is considered fertile when it contains an abundance of plant food in such a state that the plants can appropriate it as needed. Unfortunately, the elements in soil are not inexhaustible. Some of them like nitrogen, phosphorus and calcium are used up more rapidly by frequent cultivation. When partial or total exhaustion of these elements occurs, the land is kept uncropped for soil to recover. This practice is followed not only in Asia, but also in many countries of Europe. When the land is kept uncropped for a certain period, what happens is that the exhausted elements get replenished as a result of the decomposition of soil particles and the bacterial action on the colloidal material. Soil exhaustion is also retarded by the use

of crop rotation and addition of fertiliser. Another important cause of soil deterioration is *leaching*. It means that soluble mineral materials of the soil are washed and carried downward by rain water as it soaks into the soil. The problem of maintaining soil fertility is becoming more and more urgent in the agricultural region of the world. Its restoration and maintenance are dependent on human efforts and skill which no doubt vary from region to region.

Oceans and Seas in commerce

The life, industry and commerce of a country are greatly influenced by the sea, if any. Countries surrounded by oceans and seas in the temperate zone are generally noted for fishing industry. Great Britain, Norway, Canada, New Zealand and Japan have greatly developed this industry. Fishing in the high seas is the best training ground for shipping. The maritime supremacy of Great Britain is partly due to training and courage acquired by her sons through centuries of fishing in the surrounding seas. There is no more striking monument to the influence of the sea than the British Commonwealth, which is obviously the creation of a sea-faring race gifted with characteristic courage, enterprise, endurance, resource and love of freedom. The sea which is a link as well as a barrier between the scattered units of the Commonwealth has made the British build and own more ships than many other nations in the world.

The sea acts as a political boundary and gives protection against invasion. In recent times, however, the impregnability of the sea as a protection factor has been nullified by the rapid development of aircraft.

Climate on economic activities

Climate exercises a great influence on man and in even more important than physical features in determining the lines of economic advance. It is everywhere a factor which affects man and his activities. The two fundamental necessities of man are food and shelter and they are determined by climate. Natural vegetation is directly dependent on it, and this, in its turn, is a guide to the kind of activities which will be found suitable for a particular region. Some regions are practically

ruled out of account as possible homes of man. The dreary deserts and snow-capped mountain-tops of the world are of this nature; human life can exist there but only with considerable difficulty.

The development and localisation of certain manufacturing industry are influenced by climatic conditions. The cotton industry requires humid atmosphere for its localisation. The fibres of cotton will break, if they are spun in a dry atmosphere. The localisation of the cotton industries in Manchester, Bombay, Ahmedabad and Osaka were determined by the moist climate of these places. Flour-milling which requires dry climate were localised in Budapest, St. Paul, Minneapolis and Delhi. Even cinematography is dependent on climate, because it requires bright, sunny weather. In like manner, rope-making, printing and paper-making depend on the conditions of weather. Climate also decides the type of manufactures. The climate of India, being hot and moist, favours the development of cotton industry, because the people require a material which must be light to wear. The severe cold during the winter months in Kashmir has led to the growth of woollen industry, which can be carried on "indoors". In the present age, however, climatic conditions no longer influence the localisation of manufacturing industries to the same extent as it used to do in the past. For science has made it possible to make arrangements for creating necessary air conditions in mills and factories.

Transport is affected by winds, temperature and rainfall. Heavy snowfall may render railway routes and roads temporarily impassable, and low temperature may block rivers and seas with ice. The Baltic Sea is ice-bound during winter and traffic is suspended for that period. The severe winter of North Russia and Canada freezes all the rivers. For several months, all the ports along the entire northern coast of the U.S.S.R. are closed to navigation because of the extreme low temperatures in winter. Air transport also greatly depends on climate inasmuch as it is dangerous to fly in stormy and foggy weather. In the hot deserts, the construction of railways is interrupted by sand-dunes. Man with his increasing knowledge of science and technology is meeting the challenge of climate, and has succeeded in some cases to keep transport as much unaffected by climate as possible. Strong, heavy steamers with powerful engines open

up navigable channels in frozen waters of the Great Lakes in U.S.A. and of rivers in U.S.S.R. In aviation, too, planes fly much above the clouds and avoid storms.

The activity of mind and body largely depends on temperature. This is why dwellers in certain regions are most active in body and mind and have brought about successful industrialisation in their countries. These countries are mostly in the temperate zones. In contrast, the countries in the tropical and sub-tropical zones are comparatively backward in industrialisation. Whatever might be the reasons for the ancient civilisations to spring up in hotlands, the modern conditions for industrialisation demand a kind of drive, enterprise and efficiency from the people which are largely affected by climate.[9] The mental and physical energy of people is very much affected by the cold climatic conditions of the polar regions ; so also in the equatorial regions. In all such areas, the human productive energy is low. In the active life of the temperate zone, climate incites man to employ all his faculties for the betterment of his conditions. But the climatic conditions of the tropical zone affect productivity of crops and human efficiency; so progress is slow in these regions. It is a fact that people who have migrated from hot lands to temperate regions show greater energy and efficiency than what they were in their own lands. Climate, therefore, is a great factor in determining the health, energy and productivity of the people in any region. The influence of climate does not suggest that economic growth requires a temperate climate although initially climate does exercise a role. This is because men have not remained a passive victim of climate, and they have in many ways reduced the adverse effect of climate in so far as their physical and mental work is concerned. Apart from their efforts about clothing and housing, they have put to use electric fans and air-conditioners in hot lands, and central heating arrangements in cool lands. Thus, development of many industries in tropical

[9] According to Ellsworth Huntington the most favourable temperature for creative work lies between the mental optimum of 38°F and the physical optimum of 60°F, but there should be changes in temperature from day to day and season to season for the best results. His regions of optimum climate or energy regions correspond very closely with the areas having the highest civilizations.

lands are the direct result of people's efforts to minimise climatic effects.

Shape and Size of a Country

The shape of a country may be compact, fragmented or attenuated. *A compact* shape like that of U.S.S.R. or Rumania or India or China presents excellent transport facilities and opportunities for political unification. *A fragmented shape,* as in the case of Greece, imposes barriers on the movement of goods and ideas. An *attenuated* shape, like that of Chile (long but not wide), hinders farming operations.

The ultimate limitations of a country's internal development is determined by its size and by the resources within its area. The size of a country may be small, large or gigantic.[10] A small country with an increasing population cannot depend on agriculture as the main industry. As the amount of land is limited, agricultural produce cannot be large. Intensive cultivation may be practised ; scientific manuring and other impovements may be introduced ; but there is a limit beyond which the produce will not increase. Hence, people are compelled to develop other industries, and ultimately foreign trade becomes more important than internal trade and agriculture. Great Britain, Belgium and Japan are small countries with vast populations, where there has been a great development of manufactures and foreign trade. A large country, on the other hand, like China or India, with dense population will cause both agricultural and manufacturing industries to develop. But it may not have a large volume of international trade, because the bulk of its products may be required for the consumption of its people. The relative importance of agriculture and industry will depend on how the people of a state have advanced in technology. In the U.S.A. which is gigantic in size, only 9 p.c. of its population are in agriculture compared to 65 p.c. in India and 50 p.c. in U.S.S.R. Scanty population in a large country gives rise to stock-raising, as, for example, in many regions of Central Asia, Argentina and Uruguay. Also, a large size presents diffi-

[10] States with more than 1 million square miles of area are considered *gigantic,* with more than 100,000 but less than 1 million square miles of area *large,* less than 100,000 but more than 40,000 square miles *medium sized,* and the rest *small.*

culties in respect of programmes for regional development. All regions in a state may not have the same natural resources, but political and other considerations often impel a government to plan regional development, involving enormous expenditure.

A country with an increasing rate of population may be naturally interested in its size in order to absorb the surplus population. In the case of a small country, therefore, the solution lies in encouraging emigration to countries which need and invite them. There is also the temptation to claim some adjoining areas of neighbouring countries or elsewhere for living space as was done in the early thirties of the present century by Germany and Italy.

Migration as a relieving measure of increasing population is effective when a country has friendly relations with other countries or when it has its own colonies. Friendly relations may be based on similar racial characteristics or political ideologies or botth so that immigrants do not have much difficulty in getting adjusted to new environment.

CULTURAL ENVIRONMENT

Physical environment determines the extent of opportunities, but, how far will man's activities be encouraged will depend on man's cultural environment, reflected in ethnic and religious characteristics, government attitude, quality of manpower and behaviour of people towards economic, social and technological changes. All these factors are human factors. In cultural environment, all factors of it do not operate to the advantage of one another. Technological progress may not be supported by social and other institutions, and the time-lag may be too long to reap any immediate benefit.

Ethnic Groups and Commerce

Man is differentiated into three well-marked ethnic groups -White, Yellow and Black. These groups have adapted themselves in various ways to inhabit the different parts of the earth. These great ethnic groups share the world's commerce unequally. The physical characteristics of the 'white' people are an oval

face, regular features, straight eyes, a finely-cut nose and white or light skin. The temperamental characteristics of the group are that the people are highly imaginative, active and enterprising, hence at once innovative and practical. It is generally found that the regions inhabited by the white people are commercially and politically developed to a high degree and that the control of world trade is mostly in their hands. Their commercial and political supremacy is largely assisted by their culture and language as well as the climate of the regions where they live, which have made the group persevering, energetic and intelligent. Consequently, this race has exercised a great influence on the development of civilisation, in the establishment of sound social institutions, the free regulation of political and economic life and in the domains of Science, Technology and Art. The White group includes the greater part of the inhabitants of Europe, North America, India, Middle and Near East including Egypt and North Africa. The Yellow group inhabits chiefly North-Eastern and Central Asia and has its greatest concentration in China and Japan. It is advanced in civilisation and takes an important part in trade. The people have great power of endurance. Their recorded civilization, especially that of China, extends back to 1800 B.C. The people have short stature, yellow skin, flat faces and narrow slanting eyes. The Black group occupies the tropical regions and is ordinarily identified with the natives of Africa, south of the Sahara. It shows in the most pronounced way the enervating and degrading effect of tropical heat and luxuriance. There was a strong belief for a long time that social and economic progress of the Black race would remain always poor in view of the tropical climate of their regions. Since there has been migration of white people to tropical regions as in Africa and Australia, and since the whites have survived, one would not emphasise climate as the deciding factor. It is true that economically and politically, the Black group is not yet very advanced, but science and technology are being slowly developed by peoples of this group to have a share in the world progress. Certain conditions of the natural environment will, no doubt, hinder their endeavour for progress. Then again, for many years, the political control of their areas has remained in the hands of outside power. Now that most countries of theirs enjoy political freedom, their social

progress and economic growth is only a matter of time. The myth of racial superiority is being exploded.

The ethnic groups are also sometimes called (*a*) the Caucasian, (*b*) the Mongolian, and (*c*) the Ethiopic.

Although the ethnic groups of the world do not have political associations of their own yet such an inclination is present among certain races like the Arabs and the Africans on geographical and economic considerations. Most of their countries are located near one another and they form a compact area. Their historical ties are also very old. So long such alliances do not stand in the way of international co-operation, there can be balanced regional development on the basis of understanding and collaboration among countries, forming the alliance.

Religions and Economic Life

The influence of religion on man's economic life cannot be disregarded even in these days of advancement of education and of materialism. In every religion, there are injunctions to regulate man's philosophy of life. Also, there are restrictions, recommendations or inhibitions with regard to certain activities which have their impact on the economy of the society. The four main religious of the world are:—(1) Christianity, (2) Buddhism, (3) Hinduism and (4) Islam. Buddhism has existed now for perhaps 2400 years, and is, as regards the number of its adherents, the prevailing religion of the world. According to the Buddhist conception, the quality of actions determines the condition of the future life of a man. He can, therefore, always explain a calamity with reference to past life. Another assumption of Buddhism is that human existence is on the whole miserable. Buddhism, with its doctrine of "not to kill" kept many of its followers in China, Ceylon, Burma, Indo-China and Japan averse to stock-raising for meat and wool. The precepts of Buddhism, however, do not prevent its followers from taking interest in economic welfare or in social progress.

In Islam, there are prohibitory laws in respect of food and wine. Blood and the flesh of swine are strictly forbidden. The eastern regions of the Mediterranean, though favourable for the vine, have not developed any wine industry, because the

population there is predominantly Muslim, to whom wine is prohibited by religion. There is, however, much demand for coffee in place of alcohol in these countries. Among the Muslims banking institutions have not developed much because acceptance of interest however large or small from borrowers is considered an act inimical to society. Also, profiting in trade through any questionable means, except by buying and selling, is severely blamed. North Africa, South-West Asia, Pakistan, North-Western China, Indonesia, Dutch Guiana in South America, Albania, Turkey and Kirghizia (U.S.S.R.) contain a large Muslim population. The strong sense of equality and fraternity among the muslims is steadily finding their expression in building democratic institutions.

Hinduism, which is the prevailing religion in India and Nepal, is believed to have begun about 3200 B.C. in the Vedic period. The Hindu society is divided into different castes, to each of which occupation and duties are prescribed by tradition. People of one group or caste are not generally permitted according to traditional practices to follow the profession of other groups. The caste system does not appear to have been a part of the Vedic religion originally. But it arose subsequently with a religious sanction which is still maintained. The requirements of modern economic organisation have, however, relaxed the rigidity of the caste system to such an extent, that today it is no longer a force in economic life.

Christianity includes three different varieties: Roman Catholic, Protestant and Greek 'Orthodox'. The number of Roman Catholics is the largest and is estimated at more than 300 millions. They predominate in South, West and Central Europe, South America, Mexico and the north-east of the U.S.A. Christianity admits of no social or economic restrictions. To the liberality of its principles the progress of Europe and America can be partly traced. The only country in Europe whose economy has been markedly influenced by Christianity is Norway. Large quantities of Cod are caught, dried and exported to the Catholic countries of Southern Europe where Church practices require fish or meat substitutes in the diet on prescribed meatless days, and where the warm seas cannot supply the regional demand. The progress of modern education and culture along with the beliefs and opinions against

regimentation of human minds are weakening the influence of religion on the economic activities of man. But, even then, in many countries religion remains a vital factor in social and economic organisation. While sentiments about religion are very strong even today in certain countries of the world, the tendency to use religion in political and economic spheres is distinctly on the wane. Religion and progress will not go together if sentiments suggest political and economic co-operation on the basis of religion alone.

Government Attitude

We are living in an age of progress, yet far too many countries still subsist in economic conditions unworthy of our times. Poverty which engenders chaos and hinders economic development can only be eliminated from the face of the earth if genuine efforts are made to promote people's welfare. A Government plays an extremely significant role in this regard.

Although the common functions of a Government are to maintain law and order, to take measure for the protection of the State, to promote social welfare through education and health care of people, the Government has also a significant role to play to provide a social order in which the economic system will work for social good. Whether the Government is socialistic or democratic its policies can be negative or restraining or positive and promotional in respect of economic environment. The Government attitude is expressed through monetary, taxation and fiscal policies, arrangements for aids and assistance to industries, exercise of regulation and control of economic activity and involvement in economy as owners.

These six facets of governmental attitude determine the economic environment of a country. The manner in which each facet is handled will depend on the objectives and the scope for realisation.

The socialistic pattern of society which India aspires to achieve has led the Government to emphasise the key role of public sectors in bringing about rapid industrialisation. The task before any underdeveloped country is not merely to get better results within the existing framework of economic and social institutions but to mould and refashion these for wider

and deeper social values. The great social and economic changes that have taken place in India after the Independence in 1947, result from the definite policy followed by the Government in this regard. No phase of the country's social and economic life has been left untouched by the Government. Indeed, India's economic accomplishments are far greater than what are usually conceded.

In Japan from 1860 onward, the Government set up one after another such important industries as cotton-spinning mills, ship yards, arsenals, iron and steel works, in order to bring about quick industrialisation in the country. These industrial undertakings were gradually placed under private management. By 1908, Japan emerged as a great industrial power. With the establishment of the German Reich in 1870-71, Germany marched towards economic and industrial supremacy through judicious fiscal and monetary policy. More recently, these two countries again have emerged as great industrial powers even though their economies were shattered by their defeat in the second world war. In both the cases, their governments played key roles.

Efforts to improve living conditions of the peoples of the world through peaceful co-existence and through development of economic relations between all countries are the aims of all progressive Governments even though their political objectives are different.

This brings in the role of States in giving aid to underdeveloped countries. Foreign aid has two sources—the democratic free world and the communist blocs. The advanced countries like the U.S.A. in the former and the U.S.S.R, in the latter are giving loans, grants or gifts to a number of countries to fight poverty and to raise their level of economic development.

Distribution of World Population[11]

Population is considered as a resource for the economic development of any country. In 1970, the world population

[11] The term population, which was originally applied only to people, has been extended to include many other kinds of organisms as fish-population, livestock population, etc. However, we continue to use the word in its original sense.

was about 3592 million with 1107 million in the Far East, 454 million in Europe, 346 million in Africa, 148 million in Latin America, 227 million in North America and 18 million in Australasia. The world population in 1990 will increase by 1584 million of which South Asia and Latin America will account for 878 million increase. Africa will have an increase of 248 million. These are, then the areas which require long-range economic planning and programmes to gainfully absorb the increase in population.

ESTIMATES AND PROJECTIONS

(in millions)

	1970	1980	1990
Europe	454	479	504
U.S.S.R.	246	278	316
Northern America	227	262	306
Japan	101	111	118
South Asia	1107	1420	1782
East Asia	809	930	1050
Africa	346	449	587
Latin America and Oceania ...	248	337	451
WORLD	3592	4330	5188

There are many countries in a region which are still undeveloped on account of scarcity of population. Normally, the density of one person per square mile can lead to fishing and hunting, of less than five persons to pastoral economy, and of more than five persons to agriculture. Both commercial agriculture and industry require above ten persons per square mile.

All regions, however, do not offer equal opportunities for the growth of population. Cold and hot deserts, mountains, prevalence of disease and unhealthy climate are the limiting factors from the side of physical environment. That is why some regions even with rich natural resources, are still scantily populated. These regions may be located within a country. Thus, there are regions of low density in a densely-populated country as well as regions of high density in a country of low density. Canada with an average density of two persons, has an area of high concentration in the Southern region. In fact,

two of the states, Quebec and Ontario, account for 63 p.c. of the total population. In Algeria, the Southern Sahara region, comprising about 90 p.c. of the country's total area has a population of 5 p.c. of the total of 12 millions. The northern part, therefore, is a region of high density of population. A variety in density pattern is common in most countries.

The countries with extreme low density, not exceeding five persons per km, are Algeria, Zambia, Somalia, Bolivia, Saudi Arabia, U.S.S.R. (Asia), Canada, Iceland, Australia, Libya and S. W. Africa.

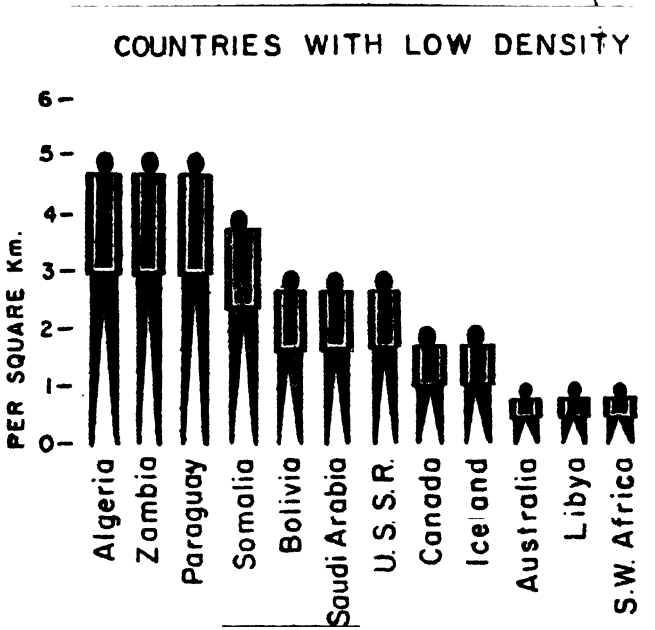


FIG NO. 2. Countries with Low Density

Similarly, a region may consist of several countries, each with a different density of population. The countries comprising Middle Africa, have not much differences in density between them. In North Europe, on the other hand, the average density is 48, but there is wide difference between countries as it is 2 in Iceland, 11 in Norway and 221 in U.K.

The world population has grown from 2516 million in 1950 to 3592 million in 1970. The projection is that by another 20 years, that is, in 1990, the population will be 5188 million in the world. In terms of percentage, the world population in 1970 was distributed continent-wise as follows :

North America	6·3
Europe and U.S.S.R.	19·5
Asia (excluding U.S.S.R.) ...	56·2
Africa	9·6
Latin America	7·9

The more developed regions like Europe, U.S.S.R., Northern America, Japan and others had 1082 million population in 1970 compared to 2510 million in less developed regions.

Apart from geographical factors, the quality of human resources also explains the reasons for density. The chief geographical factors for the growth of population are (*a*) agreeable climate for settlement, (*b*) availability of suitable land for cultivation, (*c*) presence of natural resources as basis for economic activities and (*d*) favourable location for accessibility to markets. These factors operate jointly although one or two of them may be more important at a certain stage. The colonisation of South Africa and Australia was motivated mainly by the existence of mineral deposits there. These products are still important, but other industries of greater importance have been developed in the mean time. The human resources reflect their quality in deriving benefits from the geographical factors. In other words, people must function as a positive productive force to utilise the natural resources notwithstanding impediments or difficulties in association with the latter.

All countries have human resources, but all are not trained. What a country needs is high-level man-power. Often there is a drain of this high-talent man-power from poor countries to rich countries. The advanced countries have continuous pressure to innovate and make new discoveries in science and technology. The absence of proper facilities for human development in poor countries impels many talented persons to migrate to advanced countries.

Economic progress of a country will be the normal course of events if people have desire for exploration and innovations and encourage technology and application of new techniques to resources. Largely, these qualities are influenced by the attitude of customs, institutions and philosophies, rooted in people. In older countries, more particularly in Asia, it is difficult to bring about any quick change in people's attitude from traditional way of thinking to things that are conducive to modern industrialisation. To the extent the qualities are favourable, the exploitation of resources will encourage the growth of population. There are many countries in the world which in view of their smallness in size could not have supported a large population but for the superior powers of their human beings.[12]

SOME INDUSTRIAL COUNTRIES WITH HIGH DENSITY OF POPULATION, 1970

Country	Population (In million)	Area (In '000 Km.)	Density (Per. Sq. Km.)
U.K.	56	244	225
West Germany ...	58·6	247	230
Belgium	9·7	30	315
Japan	103·5	370	275

Also, there are countries in Asia, Africa and South America where, in spite of their large size, the present population is more than what they can bear. It is not a problem of over-population as such because density is still low compared to other countries, but of under-production. These countries are over-populated in the context of production and utilisation of natural resources, and not in absolute term of numbers. Because of low level of economic development and increasing population, the people have a low standard of living, and food is required to be imported.

[12] One serious problem, now being faced by many developing countries, is the scientific brain drain. Most of the talent is being siphoned away from the countries which need it most. In 1967 as many as 5189 scientists, engineers and physicians left India, Korea, Turkey, China, Brazil, Pakistan, Philippines, Iran, Chile, Israel and Columbia for U.S.A. In terms of investment for man-power development, loss to the developing countries in 1967 came to $150 millions.

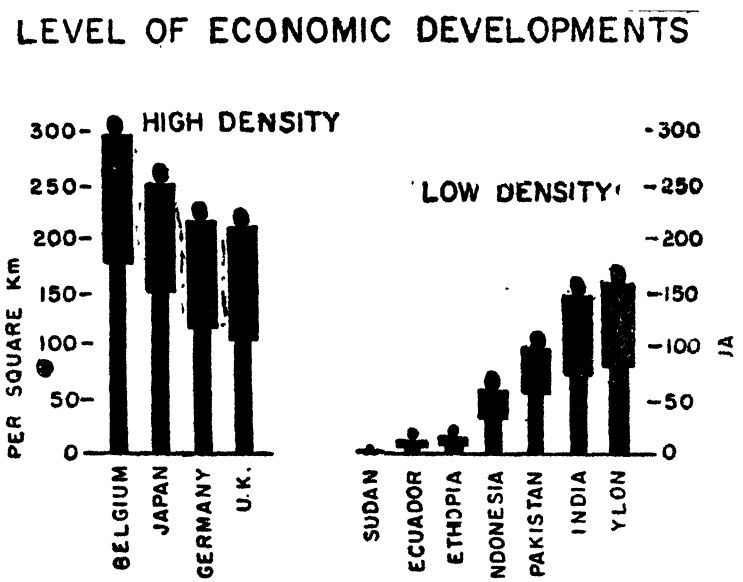


FIG. No. 3. Level of Economic Developments

SOME COUNTRIES OF HIGH DENSITY WITH LOW LEVEL OF ECONOMIC DEVELOPMENT, 1970

		Population (In million)	Area (In '000 Km)	Density (Per. Sq. Km.)
India	...	554	3,064	180
Ceylon	...	12·6	66	176
Ecuador	...	6·1	271	20
Ethiopia	...	25	1,184	22
Sudan	...	15·8	2,505	6

Large size of population can also influence the economic rowth of an undeveloped country. Large size serves as an npetus to economic development because of the desire of the eople to satisfy their own needs. In countries like India, hina, Indonesia and Pakistan, the people are anxious to deve-)p their resources as quickly as possible for better living stan- ard. As plannings in these countries are oriented mostly to ıdustrial production, shortage of food has become a serious roblem. Secondly, technological improvements can bring

quicker economic growth than through increase in populatio as in Japan, Germany, U.S.A. and U.S.S.R.

Thirdly, the countries whose populations are unwilling t respond to the new economic changes because of prejudices o beliefs will find their resources wasted, economic developmen slow and living standards of people low. Fourthly, mere increas in number does not necessarily lead to increase in the resourc of human power; human resources must be considered in term of health, education and character. Fifthly, although man i adaptable and can live anywhere in the world with the excep tion of Polar regions and the summits of the highest mountain there are obvious limitations because of climate. Extremes c cold or of heat, accompanied by low rainfall, place limitation on what can be grown. Too much rain or rainfall badly distr buted throughout the year gives rise both to floods and soi erosion.

POPULATION BY COUNTRY

(Population estimates Mid 1970) In Millions

Source: Trends in Developing Countries International Ban for Reconstruction and Development, August 1970

Afghanisthan	...	17	Malaysia	...	1
Algeria	...	14	Mexico	...	5(
Argentina	...	23	Netherlands	...	1
Australia	...	13	Nigeria	...	5
Brazil	...	93	Pakistan	...	6
Burma	...	28	Bangladesh	...	7
Canada	...	21	Philippines	...	3(
Ceylon	...	13	Poland	...	3
China (Mainland)	...	760	Rumania	...	2(
Colombia	...	21	South Africa	...	2(
Czechoslovakia	...	15	Spain	...	3
Ethiopia	...	25	Thailand	...	3(
France	...	51	U.S.S.R.	...	24
West Germany	...	59	Egypt	...	34
India	...	547	U.K.	...	56
Indonesia	...	121	U.S.A.	...	205
Iran	...	28	Viet Nam (N)	...	21
Italy	...	54	Yugoslavia	...	21
Japan	...	104	World	...	3592

Finally, limitations in habitable land area in the world and the difference in population pressure between neighbouring countries were most potent factor in creating international conflicts in the past. Even now, such situations are possible. The rate of increase in population and the rate of economic growth are not balanced. A world population increase of 50 p.c. between the years 1960 and 1980 may lead to a world catastrophe in the food situation. There is urgent need for greater economic growth as well as for family planning. Hence, population problem has implications in national and international planning.[13]

QUESTIONS

1. "The mode of life in any given region is not an accident but is a product of environment." Explain the statement.

2. "The nature of coast-line of a country affects its commercial and industrial development to a great extent." Discuss the statement with at least two examples.

3. Write a short essay on the effect of climate, both direct and indirect, on the industries of a country. Illustrate your answer with some conspicuous examples. (Cal. Inter. 1953)

4. "Man's character and occupation have been decided by the geographical conditions under which he lives." Illustrate this remark with reference to Japan and India.

5. "No factor of his environment exercises a wider influence on man and his economy than climate." How far is this remark true? Give precise illustrations.
(Punjab B. Com. 1967)

6. "The human habitat is influenced largely, if not wholly, by the soil and the climate in which man lives." Illustrate this statement with reference to examples. —(Cal. Inter. 1953)

7. Give an account of the world distribution of population. Why are some areas thickly populated and some sparsely populated?
—(Cal. I.A. 1951)

8. Account for the great unevenness in the distribution of population in Asia. Is this unevenness a permament feature? What are the economic-geographic effects of population densities in such regions?
—(Agra B. Com. 1953)

[13] One measure of economic growth is the *Gross National Product* which is the sum of the values of all the goods and services produced by a nation in a given period. The measuring sitck by which GNP is compared for different periods is the *constant currency*—dollar, sterling, rupee etc. The constant currency is adjusted for year to year changes in the price level so that a unit of currency can always measure the same quantity of goods and services. With the *constant unit of currency*, one can measure real changes in national product. The measure, however, does not indicate real national product per person.

9. "Nearly two-thirds of the human population are concentrated in about one-tenth of the land surface." Describe and account for this peculiar distribution.

10. "It is said that man's ability in exploiting the resources of his environment will depend upon his knowledge, intelligence and culture as well as on the social structure of the country he lives in."

—(B. Com. Delhi 1958 ; Rajasthan B. Com. 1960 ; Delhi B. Com. 1971)

11. Examine the geographical and economic conditions that influence the distribution of population in a country.

—(Delhi, B. Com. 1963 ; I. I. B. 1968 ; Delhi B. Com. 1971)

12. Examine the co-relation between physical and cultural environment on the one hand and the man's economic activity and living standard on the other. —(Cal. B. Com. 1964)

13. Examine the causes and consequences of high and low densities of population in the world. —(Delhi B. Com. 1965)

14. Discuss the factors which favour the growth of population. Mention, giving reasons, the thinly populated regions of the World.

—(Indian Institute of Bankers, 1967)

15. What are the main features in the geographical environment of man ? Give suitable examples to illustrate how human activities are influenced by them. (Indian Institute of Bankers, 1969)

CHAPTER II

NATURAL REGIONS, STAGES OF ECONOMIC DEVELOPMENT AND INTERNATIONAL ORGANISATIONS

Never before in the history of mankind, there had been so much differences in the living standards, in the economic structures and in the rate of economic growth as they are in the world today. There are, indeed, vast disparities between regions and regions. Why the disparities exist and how can one understand their perpetuity are questions which require a framework of investigations about countries in order to obtain explanations in respect of activities by which growth agents manifest themselves. The framework of investigation can be on the basis of natural regions, political divisions and stages of economic development.

NATURAL REGIONS

The same type of climate does not prevail all the world over. Some countries have a hot climate, some possess a mild climate and others have an extreme or cold climate. Economic products vary with differences in climate. Despite these differences, we find on comparison that an area in one part of the world has almost identical climate, animal life, vegetation and occupation with those of another situated far away. It has thus become possible to divide the world from the standpoint of climate and production into a number of natural regions.

A *natural* region is "an area of the earth's surface which is essentially homogeneous with respect to the conditions that affect human life". Within each natural region climate, vegetation and general methods of living are similar.

In any natural region, the physical conditions are never fully identical in any two widely separated areas and, even though they are classified as belonging to some particular type of natural region, they do not have all the conditions in common.

The cultural differences will be always there. Secondly, the classification of natural regions, primarily on a climatic basis, it at best an approximation, and the placing of regions in a particular category means that they have more resemblances than differences. Thirdly, the limits of any natural region are also approximate. The change from one natural region to another is often very gradual and not abrupt. Fourthly, for obvious reasons, natural regions do not conform to political boundaries and the same natural region may cover two or three countries. Fifthly, the inclusion of certain regions in definite types is not without controversy. For example, some consider the lower delta area of the Ganga, the West Indies and the Philippines as belonging to the Rainy tropics while others include them in the Monsoon tropics.

In spite of all these limitations, the study of natural regions is of great practical importance because the lands in each region can be developed on similar lines. Indonesia, Brazil and Congo belong to a common natural region. If rubber can be grown in Brazil and Congo basin there is no reason why Indonesia or India will not grow it. As a matter of fact, about fifty years ago Brazil and Congo area had a monopoly in rubber supply. But subsequently, rubber plantations were opened in Indonesia and Malaysia from where more than 90 p.c. of the world's rubber is put in the market today. Another advantage of the understanding of natural regions is that one can know what should be the natural pattern of trade between different regions.

The world can be divided into fifteen natural climatic regions of which four are in tropical hotlands, four in warm temperate lands, four in cool temperate lands and three in the polar regions.

Tropical Hotlands

(a) *Wet Equatorial Forest region or Amazon type.* The climatic features of this region include high temperature, very slight seasonal changes and heavy rainfall throughout the year. Temperature is high because the sun always shines from a very high position in the sky. Again, the constant excessive heat keeps the air warm and makes it expand and rise. On reaching higher levels, it cools so much that its moisture is condensed

and then falls as rain. Equatorial areas are, therefore, wet as well as hot. There is much humidity in the air and the difference between day and night temperature is greater than the annual range. The climate of this type is mostly found within about 10° of the Equator. The rainy tropical lands may be divided into two sections—(*a*) areas on or near the equatorial belt of variable winds and calms (the Doldrums) with convection rains and general lack of winds ; and (*b*) areas farther from the equator which lie in the trade wind belts. The first section includes the Amazon basin in South America, the Congo basin in Central Africa, the Malaya Peninsula, and Indonesia. The second section includes the coasts of Southern Brazil, Central America, Madagascar, and coastal strips of West Indies. The lack of sunlight beneath the forest keeps the land grassless, and consequently ground animals are few. In these areas dense vegetation covers everything. Huge trees of great variety spread out their branches and make the lower part of the forest half dark. *So the equatorial regions are sometimes described as regions of twilight.*

Some parts of the equatorial region contain valuable minerals: tin in Malaysia and Indonesia, graphite in Madagascar and Ceylon, bauxite and manganese in Ghana and copper in Katanga and Northern Rhodesia. The forest lands contain rich storehouses of food stuffs and raw materials of industrial value. The region enjoys a monopoly in the production of bananas, cabinet-woods, spices, rubber, cocoa, dye woods and ivory—all of which are in great demand in Europe and America. Bamboo is a typical product of these regions. Important commercial products are spices, guttapercha, palm, oil-nuts, coffee, cocoa-nuts, sago, bananas, resins, lac, myrobalans and chicle (chewing gum). The animal life is mainly arboreal like insects, birds, apes, bats and monkeys. Elephants, tigers, leopards, and rhinoceroses are also found. There is a great scarcity of domestic animals.

The countries within this region normally export timber, rubber, coffee, bananas, copra, nuts, pineapples and sugar.

There are certain serious obstacles in developing many of these regions. Of them the most prominent are odious climate, diseases, poor soil, rapid growth of weeds, scarcity of domestic animals, and inadequate means of communication. In spite of

the fact that tropical diseases are no longer rampant, the people cannot do much hard manual work because of the hot and moist climate which induces in the inhabitants a sort of rapid physical and mental tiredness. The means of communication are inadequate as the swampy nature of the lands and the rapid growth of weeds make the building of roads and railroads difficult. The rivers and streams serve as the only means of inter-communication. The soil is generally poor and in many areas people still practise *nomadic agriculture* which involves cutting down a section of forest, burning the bush and planting a garden for crops like beans, bananas etc. After a few years when the soil is *leached* by rain, a new strip of forest is cleared. In the tropical Far East, however, the means of communication are much better and the economic development is the highest of all equatorial lands. Here much of the land is elevated and therefore provides a healthy climate for settlement. It is the only equatorial region in the world with a long stretch of coastline. The interior of the tropical Far East is also accessible. *Plough agriculture* is the dominant occupation of the people of South-East Asia. Agriculture is much more stable here than in African lands. Rice and sugar-cane are the principal crops.

In spite of the handicap about climate, the people have the will to pursue policies for economic and social development and to remove poverty, illness and ignorance.[1]

(*b*) *Monsoon and Sudan Regions* (*Monsoon Tropics*). The chief areas are India, Bangladesh, Burma, Thailand, Cambodia, Viet-Nam, Laos, Philippines, Southern China, the Campos of Southern Brazil, the Llanos of the Orinoco river basin of Northern South America, the coastlands of Southern and Eastern Mexico, Southern Sudan, Queensland and North Australian coastlands. The monsoon regions mostly occupy the eastern margin of the continents within the latitude of 80° and 25°.

High temperature throughout the year and heavy rainfall during summer are the main characteristics of this region. In summer, these areas become so hot that the air becomes thin and rises higher up ; the cool air from the sea comes in to take

[1] With political stability and co-operation from international organisations, many natural obstacles can be overcome. In fact, tremendous changes have already taken place in many tropical countries to hold out better future for the people.

its place, thus causing rainfall. "Thus seasonal change of the winds takes place with the most remarkable uniformity and regularity. It is very different from the changes in the variable winds of the temperate zone. Its periodicity has always been a dominant influence upon various forms of human activity, opportunity, problems and resources". Thus, in summer the Monsoon lands have winds from sea to lands and therefore it is the wet season, and in winter the winds blow from land to sea and therefore it is the dry season.

Japan and North East China are not classified with the monsoon countries, though they are subject to monsoon winds. Winters are too cold in North East China and Japan.

The distribution of rainfall in the monsoon lands depends upon relief features. Lands having mountains opposite sea receive heavy rainfall. Cherrapunji at the foot of the Shillong plateau in Assam has about 500" rainfall—the heaviest in the world.

The climate is more healthy and less enervating than the Rainy tropics.

The natural vegetation of the Monsoon tropics is deciduous forest or tall grasslands. These grasslands are called Savannas, some of which have regional names. The products of natural vegetation are teak, sal, sandalwood, lac, bamboos, gum and camphor. Sal and teak are found in Burma, Viet-Nam, Thailand and Indonesia. Sandalwood and lac are the products of the Indian forests. Bamboos and gum are found all over the monsoon lands.

Agriculture is the main occupation of the inhabitants of all the monsoon lands. Rice, maize, millet, sugar-cane and cotton are grown nearly all over the region. Coffee, tea, cocoa, tobacco, indigo, cinchona, jute, rubber, oil-seeds and pulses are other important crops which grow in these areas. The bulk of the people take rice as their chief food. Rice is the most important crop and it grows in the river-deltas and the terraced hill slopes. In monsoon lands of Asia tea cultivation has become a great commercial success on account of the cheapness of labour.

In Asian monsoon regions man's well-being depends largely on rainfall. "It is still true to a large extent that with an eye on the sky for the monsoon and with his hands in the earth for food, man lives close to nature." There is no other single group

of weather phenomena which is so far-reaching in its effect on man's economic life as the monsoon in Asia. If the monsoon fails, the agricultural products will not grow, and as a result, famine will break out. Not many years ago, so complete was the dependence of the people on the monsoon for agriculture, and so utterly unable were they to cope with its uncertainty, *that they became fatalists of the most extreme kind.* Today, however, because of the development of irrigation works in most of the monsoon lands, this dependence is not absolute. The density of population being the highest in these regions, the pastoral industry has not developed, for it requires extensive lands. Mining is receiving serious attention nowadays in Burma, India and China. Northern Australia and the Lower Mississippi basin in the U.S.A. also experience a monsoon type of climate. The north-west coastlands of Australia are capable of considerable agricultural development, and are already producing rice, bananas and cotton. The Lower Mississippi basin is not a typical monsoon region, though it does experience heavy summer rains. This area is the world's largest cotton growing belt.

There are few countries in the world today where the governments and people are more active in their efforts to raise the living standards of people through economic development as in some monsoon countries. Also, there are few countries in the world which received greater aid and assistance from international organisations in such efforts as in monsoon lands.

(*c*) *Sahara Type or Low Latitude Deserts.* The hot deserts of the world are generally situated near the tropics and only on the western sides of the land masses. These areas are Sahara in Africa, Arabia, Thar in India, Colorado in the U.S.A., Peruvian and Atacama deserts in South America and the Great Sandy Desert of West Australia. Deserts occupy about one-fourth of the land surface of the earth. The eastern margin of the continents do not have hot deserts.

Rainfall is scanty throughout the year, the mean annual rainfall being less than 2 inches. The summer is very hot, but nights are usually cooler than days and in winter the temperature is very low. These characteristics are modified to a great extent along the sea-coasts of the deserts. The cool ocean currents influence the climate along the desert coast of

Peru, Northern Chile, the Kalahari in South-Western Africa, the Moroccan Sahara, Somaliland and North-Western Mexico. The climate is not, generally, unhealthy in these regions. Travelling in these areas is often disturbed by clouds of dust swept along by strong winds. In Sahara such dust storms are known as *Simooms*.

The characteristic date palm and fig trees provide man's material needs in the deserts. Wheat, millet, Mediterranean fruits, cotton and sugar-cane are grown in the irrigated areas of deserts. Cattle-rearing and trade in dates, salt and leather goods are carried on. Hot deserts are all regions of lasting difficulty except for a few small isolated oases which support a scanty population.[2]

Nevertheless, much economic activities are going on in many hot desert lands on account of discovery of minerals. In fact, the presence of minerals has been responsible for much economic activities in many desert regions which would have remained otherwise always undeveloped. This is true of deserts, both in the Southern and Northern Hemispheres. In the Southern Hemisphere, the mineral concentrations are as follows :—oil in the narrow coastal desert of Peru ; nitrate and copper mines in the Atacama desert of Chile ; diamond fields in the Kalahari desert of Africa ; gold-mining in the region of Kalgoorlie and Coolgardie in West Australia ; lead and zinc in the desert region of New South Wales. In the Northern Hemisphere the important mineral-bearing deserts are the Sahara for salt, the Colorado for gold and Middle East for petroleum. At all desert places, the supply of water is a problem, but so great are the inducements for developing minerals, and so large is the income from these minerals that the inhabitants have, in many cases, arranged for water supply even from distant places. In the gold fields of Kalgoorlie and Coolgardie in Australia the water is supplied from Perth. The mines at the Atacama desert of Chile are supplied with water by pipes from reservoirs in the Andes.

High Plateau or Bolivian Type. The highlands of the tropics include the Bolivian Plateau, the Himalayas and Tibet. Different grades of climate are found in these areas according to

[2] The discovery of petroleum and a few other minerals has made many desert regions as regions of opportunity.

height, which account for the difference in cultivated products. Sugar, wheat, maize and fruits flourish on the hill-slopes of the Andes, and tea on the slopes of the Himalayas. Tibet is largely a land of ice and snow, and for the most part the country is desolate and void of vegetation ; only in a few selected places of low elevation, the people carry on grazing and agriculture. Yaks, asses, cattle and sheep are also reared in the lower areas of Tibet. The strategic location of Tibet and Himalayas has made it imperative for India and China to develop roads and other means of communication in these highlands, setting a base for a new kind or mode of life for their people with more direct economic ties with people outside.

Warm Temperate Lands

(*a*) *Western Marginal Region or Mediterranean Type.* The lands lying on the western margins of continents between latitudes 30° and 40° in either hemisphere constitute the Mediterranean region. It includes the Mediterranean lands (comprising Spain, Portugal, Southern France, Italy, Yugoslavia, Balkan countries, Syria and North Africa), the Pacific sea-board of North and South America (California and Central Chile) and the south-western extremity in South Africa and Australia (the south-west of Western Australia, the south of South Australia and North New Zealand).

Mediterranean lands have many similarities with monsoon lands in respect of the importance of rainfall and agriculture. All the same, there are striking differences as well. The distinguishing climatic features of the Mediterranean lands are the following: —

(*a*) Most of the rains fall in Winter and there is drought in summer, (*b*) winters are mild, and (*c*) skies are very sunny, being cloudless in summer. The hot sunny weather is ideal for ripening of fruits which the regions are famous.

The Mediterranean lands have rainfall between 20" and 30". These lands have mostly seas on one side and mountains on the opposite. In areas where mountains are absent, the rainfall is scanty and desert conditions prevail. The length of the rainy and dry seasons varies with latitude and the situation with

respect to the mountains and the sea. There are also local variations in climate. Summers are usually cool near the seaside, but a few miles inland the summer temperatures are high.

The pleasant climatic conditions of these lands invite tourist-traffic, specially during the winter, for health and recreation.

Vegetation mostly consists of evergreen trees and shrubs. There is little grass vegetation because of the long summer drought and the absence of surface moisture. These facts also account for poor pastoral industries. Wheat is the most important crop in the Mediterranean lands of Europe where it is sown in autumn in order to take advantage of the largest part of the year's rainfall. Barley is also cultivated widely. The best known characteristic plant is the olive which grows throughout the year. The cork oak, the sweet chestnut and mulberry are other useful trees. The region is mainly noted for fruits like orange, lemon, peach, apricot and fig, which are in great demand in other parts of the world. Grapes are extensively grown all over the Mediterranean region but only a few countries specialise in wine-manufacture. France, Portugal, Italy and Spain produce wine. All Mediterranean lands have similar climate, but the long distances to large markets and the nature of the surrounding regions are responsible for the regional variations in regard to products.

Fresh grapes are exported from Spain and California and dried grapes in the form of raisins from Asia Minor and California. Figs are famous in Asia Minor.

Where conditions are suitable, horses, cattle, sheep and pigs are reared. Asses, mules and goats are typical animals.

Although most of the Mediterranean areas are predominantly agricultural, manufactures have also greatly developed in certain regions like Southern France, Southern Spain and Italy. The silkworm of mulberry trees has made the Mediterranean region noted for the silk fabric. Man's struggle for existence is not severe, because the climate of these lands is highly suitable for crop production. Moderate effort is needed to gain a living from the land. The success in the use of natural resources has led these countries to develop other manufactures not only for domestic consumption but also for world markets.

(*b*) *Eastern Marginal Region or China Type.* The chief sections of the region are North and Central China, Western Korea, Southern Japan, eastern side of the U.S.A. (approximately Iowa, Missouri, Arkansas, Eastern Texas and Gulf Coast). South-Eastern Brazil, Uruguay, South-Eastern coast land of the Union of South Africa, sea-board of New South Wales and Southern Queensland.

These areas get summer rains. Hot summer and very cold winter are the peculiar climatic features in these areas.

The valuable trees are yellow pines, walnut, chestnut, beech, magnolia and oak. The important crops are maize, millet, pulses, rice, indigo, tobacco, cotton, camphor, tea, banana, orange and coffee.

Population being very dense in the Asian lands, domestic animals are few ; but not so in Uruguay, Brazil and South Africa, where cattle-rearing has developed greatly. Manufactures are highly developed in Southern U.S.A. and Japan.

(*c*) *Interior Lowlands or Turan Type*: The major sections are Turan, Trans-Caspain and Caspian districts in Russia, Danubian Plains (Rumania and Hungary), Manchuria, West-Central States of the U.S.A., North Argentina, interior parts of New South Wales, Victoria and South Australia.

These lowlands have extreme climate and scanty rainfall. Cattle, sheep, horses, camels and goats are reared. With the help of irrigation maize, barley, fruits and cotton are grown extensively. Most of these countries are now witnessing industrialisation.

(*d*) *Interior Highlands or Iranian Type.* The chief areas are Iran, interior of Asia Minor, Afghanistan, the western part of Pakistan, interior lands of the Southern States of the U.S.A., Mexico and interior lands of South Africa.

The climate of these highlands is extreme. The rainfall is scanty and lands are either poor grasslands or actual deserts. Agriculture is possible in areas where mountain streams and oases are found, and irrigation methods are pursued. The chief agricultural products are cereals, fruits, cotton, tobacco, sugar-cane, beet and roses. Cattle, sheep, horses and camels feed on the richer grasslands. Mineral wealth is great but it is exploited on modern lines only in U.S.A. and South Africa. Manufactures are carried on in all areas.

Cool Temperate Lands

(*a*) *Western European Regions or Temperate Ocean Regions.* The typical sections are British Isles, South-Western Scandinavia, Denmark, Western Germany, Netherlands, Belgium, Northern France, Northern Spain, South-West Canada, Southern Chile, Tasmania and New Zealand.

These regions have moderate rainfall throughout the year as well as mild temperature. The mild climate is primarily the result of oceanic influence. Warm ocean currents flowing to the west of these regions make the winds warm and supply them with moisture.

Maple, oak, elm and beech flourish in the warm lowlands. Coniferous trees like pines and firs grow luxuriantly in the cooler and damper uplands. Oats, rye, potatoes, beet and vegetables are the chief crops. Wheat grows best in the drier parts with sunny summers. Cattle, horses and sheep are also reared. Easy access to markets has helped the growth of dairy farming.

In the western part of Scandinavia and British Columbia fishing is more important than agriculture.

These areas are highly developed in commerce and industry. The development is particularly great in Western Europe where mineral resources are vast, transport facilities excellent, climate best suited to human energy and situation ideal for trade. Till recently, Britain led in commerce and colonisation, France in romantic thought and taste, Germany in technical research. Agriculture is highly scientific and manufactures and commerce have reached a high degree of development and progress. Australia and New Zealand have also made remarkable progress in manufactures and transport.

(*b*) *Eastern Margin of Cool Temperate or St. Lawrence Type.* The main areas are the Amur Valley, Armenia, Korea, Northern Japan, St. Lawrence basin (Eastern Canada, and Labrador, South of the Tundras, East of the Prairies), Newfoundland, U.S.A. (South East and higher Appalachian slopes) and South-East Argentina.

These areas receive a small amount of rainfall which comes mostly in summer. Temperature is low during summer and very low during winter. The rivers and harbours are generally ice-bound in winter.

Forests of commercial value are abundant in this region. North-East America and Asia have coniferous and decidous trees, which are important for fur-bearing animals. In the cleared areas, agriculture and dairying are practised. Lumbering is important in North America. In such regions of Canada and the U.S.A. fishing, mining, agriculture and manufactures have reached highest development. In Asia, Japan occupies the premier position in manufactures, which in Manchuria, agriculture and mining are developing rapidly.

(*c*) *Interior Lowland or Siberian Type.* The conspicuous areas are central lowlands of Asia, Poland, Siberia, eastern parts of Germany, Sweden and Northern Prairie lands of North America. There is no region of the Siberian type in the Southern Hemisphere.

These sections have extreme climate, winter being low and severe and summer short. Rainfall is never heavy, but generally abundant in summer.

In the northern side of the region, coniferous forests of pine, spruce, firs, etc., are abundant and in the southern side trees are rare and vast grass-lands stretch in all directions. These grass-lands are called 'Prairie' in North America and 'Steppe'[2] in Asia.[1] Agriculture is the chief occupation in these areas. In the arid areas stock-raising is prominent. The Western Steppes of Eurasia are very productive, but the Eastern Steppes are handicapped by their remoteness from the more advanced parts of Europe. Nevertheless, good progress has been made in recent years in respect of agriculture, transport and manufactures.

(*d*) *Interior Highland or Altai Type.* The important areas under this type are the Altai Range and adjacent lands of Asia. northern parts of the Western mountain region of North America, British Columbia in Canada and the North-Western States of the U.S.A.

Climatic conditions vary in accordance with elevation. Generally the climate of these areas is very extreme. Forests are abundant and spruces, firs, douglas and larches are the prominent trees.

Highlands are rich in minerals and mining has developed much in the U.S.A. Agriculture is practised in the valleys with

[2] "Steppe" is a Russian word applied to all treeless districts except deserts.

he help of irrigation. Lumbering is the main occupation of the eople in most areas.

Polar Regions

The most sparsely populated and the least developed areas n the world are the Polar regions. The Polar regions occupy he vast areas to the north and south of the Cool Temperate one. The regions are divided into three parts: (*a*) Taiga or orest region, (*b*) Tundra or plain, (*c*) Ice caps or Highlands. he Tundras and the Ice caps of the Antarctic are uninhabited.

(*a*) Immediately to the north of the Cool Temperate Zone stretches the forest region or *Taiga*. Winters are long and evere with short days and long nights, while summers are short and cool with very long days and short nights. Pines, firs, larch, and other coniferous trees are abundant. The timber resources of these forests have not been exploited because of transport and climate difficulties. In these forests fur-bearing animals are numerous. The bulk of the world's valuable pelts is collected from these regions. Agriculture, though not impossible, has not developed and the main occupation of the people is hunting and trapping. Population is consequently sparse.

Of domestic animals reindeer is the most important and is extensively reared in Alaska.

(*b*) The *Tundras* lie to the north of Taiga in Northern Eurasia and America within the Arctic circle. These lowlands have lower temperature than Taiga. With the exception of two months in the year lands are always covered with snow; consequently agriculture is impossible. The Tundras are unforested with the exception of trees occasionally found in the valleys. In summer, when the snow melts for a few months, plants like mosses, lichens and grasses grow rapidly. Reindeer, caribou, arctic fox, dogs and the musk ox are numerous in the "Arctic prairies" of Northern Canada and Alaska. Fish, seals, walruses and whales are also plentiful.

The Tundras are the most desolate deserts of the world, having a very sparse population. Nowhere does the density of population exceed one person per square mile.

The semi-nomadic Lapp tribes occupy the Tundras in Europe to the west of the White Sea. In North American Tundras, the Eskimo tribes have settled along the shores. The means of livelihood being few, people are mostly nomads. Food and clothing are derived mainly from the Tundra animals —their meat supplies the food, and skin the clothing. The people are simple and primitive, and their life is hard ; so they have little time for intellectual pursuits. The Tundras are called the regions of privation. In winter, work is impossible. The only domestic animal is the dog, useful generally for transport purposes. Though the Tundra has little economic importance it contains some minerals which remain unexplored.

(*c*) The *Polar Highlands*—N. Alaska, N. Greenland, Antarctica, Kamchatka and other adjacent lands have no vegetation because temperature is mostly below freezing point throughout the year and lands lie covered under a thick sheet of ice and snow over 1 to 3 thousand feet in depth. Only in Greenland peaks of mountain come out of the snow sheet. Icebergs originate from these lands. The only economic enterprise is the whaling industry carried on by the peoples from the Lower Latitudes, *e.g.* Norway, U.K., Japan and U.S.A. Each whaling vessel is like a factory, as all the arrangements for extracting oil from the whale are made in the vessel itself while at sea.

STAGES OF ECONOMIC DEVELOPMENT

The countries of the world are at different stages of economic development. There are four stages in economic development: (*i*) pre-industrial stage, (*ii*) industrial preparation stage, (*iii*) take-off stage and (*iv*) advanced stage. A few countries in Asia, Africa and South America are still on the pre-industrial stage which means that these are not yet imbued with conscious aspirations and expectations to plan and promote economic growth on their own for raising living standard. There is little utilization of potential resources because of obstacles inherent in social institutions of a country. The pressure of population is not high, as the population is scanty. There is a strong attitude of veneration towards traditional values and customs which remain even today uninfluenced by outside world. Whatever primary products are

raised, these are mostly consumed within a country, and a little is exported outside. Imported goods, if any, are consumers' goods only. Broadly, exports are in excess of imports. The second stage is the industrial preparation stage in which the countries are bringing changes through development plans for economic growth. The countries are becoming increasingly development-minded, and the Western world has demonstrated its interest in these development plans by providing technical and capital assistance in a manner novel in history. As in the pre-industrial stage, there are also obstacles from social institutions with impact on technology, prolonging the period of preparation stage, but conscious efforts are evident to use modern techniques and equipment, and to introduce changes in the social environment to fit in with economic needs. In all these countries, man-power development, therefore, is the main concern. It is recognised that a suitable system of education can promote social changes and contribute to economic growth by training man-power and creating requisite attitudes in people. In the preparation stage, the need for capital and equipment necessarily keeps the volume of import very large. In fact, this excess of import is the normal feature of foreign trade of a developing economy. The next stage is the industrially developed stage when the economy of a country and its society have transformed themselves in such a way that economic growth has become more or less automatic. This transformation is also called "the take-off stage". In developed stage, imports of capital and capital goods are less, and more and more manufactured goods are exported. There is also the preparation for extending the sphere of economic influence to other countries by offering technical assistance or collaborative arrangements for the development of industries outside.

The final stage is the industrially *advanced stage,* permitting a country to think not only in terms of trade but also of investment outside. The use and scope of investment within the country to augment the productive resources further become limited, and the country is now in a position to lend to or invest in other countries, mostly underdeveloped. A country in the industrially advanced stage has a very high per capita income—about Rs. 3,000, an advanced technology for

mass-production methods, sound economic structure, adequate and flexible system of transportation, organised arrangements for man-power development, high expectation of life at birth, and an international outlook for the sake of commerce and peace. If labour is abundant and raw material scarce, attention is paid to obtain greater or improved production from same raw materials, but where labour is relatively limited, the people are forced to produce more labour-saving devices.

Development in Countries and Regions

The different stages in economic development do not suggest, however, that in any country, all its regions have the same progress or stagnation. An advanced country can have regions of pre-industrial or preparation stages within it, as a country in preparation stage can have a region or two of highly developed industries. So in determining the stage of a country, one takes into consideration the industrial efforts and achievements in terms of the percentage of population involved in them directly, and of general benefits to entire population reflected in their real income. In fact, per capita income is considered as the basis of distinction between these stages.

On the basis of the stage or level of economic development, the world can be divided at a particular point of time into highly developed, intermediate and underdeveloped. The actual place of a country in this division will depend on how its per capita income, gross national product and export volume, compare with those of others. Since these factors are constantly changing, the world stage also changes.

COUNTRIES GROUPED BY LEVEL OF ECONOMIC DEVELOPMENT[4]

A. Highly Developed

North America : Canada
U.S.A.

[4] The World is also divided into three groups: the first World (developed countries), second World (the Socialists countries) and the third World (developing countries). The developing countries occupy practically the whole of Africa, except South Africa, the whole of Latin America and about three-fifths of Asia. This division indicates the scope and nature of economic interest of one country in another on the basis of political ideologies.

Europe	Belgium	Netherlands
	Denmark	Norway
	France	Sweden
	West Germany	Switzerland
	U.K.	U.S.S.R.
Oceania	Australia	Japan
	New Zealand	

B. Intermediate

Africa	South Africa	Puerto Rico
South America	Argentina	Uruguay
	Chile	Venezuela
	Cuba	Czechoslovokia
	Austria	Hungary
	Finland	Italy
	Ireland	Portugal
	Poland	
	Spain	
Asia	Israel	

C. Underdeveloped

Africa	Algeria	Morocco
	Angola	Nigeria
	Congo	Nyasaland
	Cameroons	Rhodesia
	U.A.R.	Sudan
	Ethiopia	Sierra Leone
	Kenya	Tanzania
	Liberia	Uganda
Asia	Afghanisthan	Formosa
	Indonesia	India
	Burma	Pakistan
	Ceylon	China
	Korea	Iran
	Iraq	Turkey
	Bangladesh	Lebanon
		Nepal
		Philippines
		Malaysia
		Saudi Arabia
		Indo-China
		Thailand
America	Costa Rica	Dominican Republic
	Ecuador	El Salvador
	Haiti	Hondurus
	Mexico	Nicaragua
	Paraguay	Peru

Developed and Underdeveloped Countries

The countries are divided on the basis of per capita income, into (*a*) developed countries, and (*b*) underdeveloped countries. The underdeveloped countries are those "in which per capita real income is low when compared with the per capita real income of the United States of America, Canada, Australia

and Western Europe". The richest of the world's citizens is the American, whose yearly per capita income is $4,050 from the gross national product. In Sweden, it is $2,581 and in West Germany $2,030. Per capita income is considered low when it is roughly less than $600 per year. According to this, only 15 countries in the world have this or higher than this per capita income.

There are about twenty countries today which are on the border of this index. The rest of the countries in the world with less than $600 per capita income are still underdeveloped.

The estimated income per person in underdeveloped countries and territories associated with the United Nations averaged slightly over $150 per person. National income grows at the rate of 3 p.c. a year, but because there is also a large increase of population every year in these countries, the net increased income per person is only about 1 p.c., that is, about $1 a year. Soviet Union has the fastest growing economy with a yearly increase of 12 p.c. It has been observed that in countries with little industrialisation, economic growth is faster than in the highly industrialised nations. The per capita gross national product index however declines at a faster rate because of the increase in population.

Countries of lowest income group with about 50 p.c. of the world's population share only 16 p.c. of the world income, while those of highest income group with 8 p.c. of world population share 28 p.c. The countries which are industrialised and enjoy income a little less than those of the highest group, share 17 p.c. of the world's income with about 7·5 p.c. of world's population.

GROSS NATIONAL PRODUCT PER CAPITA OF CERTAIN COUNTRIES IN 1968.

(in U.S. Dollars of 1964)

U.S.A.	...	3980	Ghana	...	215
Canada	...	2519	India	...	89
Germany (W)	...	1950	Brazil	...	242
U.K.	...	1821	Malaysia	...	283
Japan	...	1180	Burma	...	65
Israel	...	1240	Nigeria	...	71
Italy	...	1228	Yugoslavia	...	453

Thus, the income disparities in the world have posed a world problem with economic, political and social consequences of great magnitude.

It is, however, well to bear in mind that low per capita income does not indicate its levels of civilization, culture, or spiritual values. It is not also the cause of economic development though it furthers development. It is the result of a number of factors that characterise the economy of a country. These factors are economic, demographic, cultural, political and technological.

The characteristics of underdeveloped countries or areas are the following:

ECONOMIC:

(i) There is a very high proportion of agricultural population (from 70 p.c. onward) with uneconomic size of holdings and poor techniques leading to a feeling of land hunger.

(*ii*) There is lack of employment opportunities outside agriculture and there is evidence of considerable disguised unemployment.

(*iii*) There is no saving for the large mass of people, as savings are in the hands of land-owning class.

(*iv*) Cereals and primary raw materials are the characteristics of agriculture along with low yield per acre. These also constitute major exports.

(*v*) People spend mostly on food and necessities, and housing conditions are poor.

(*vi*) There is considerable rural indebtedness.

In addition to these characteristics, the developing countries have problems which are demographic, cultural, political and technological in nature.

DEMOGRAPHIC: High fertility, high mortality, low expectation of life, inadequate nutrition, malnutrition, overcrowding in rural areas and lack of facilities about sanitation are common.

CULTURAL AND POLITICAL: High degree of illiteracy, child labour, weakness or absence of middle class, inferior status and position of women and the prevalence of determined beliefs and values deplete human powers.

TECHNOLOGY: Absence of or inadequate facilities for technological education, old-fashioned technical methods, low

yield per acre and poor transportation, are some of the problems confronted by underdeveloped countries.

All these factors affect human powers by being ineffective to be of use for raising living standards. There must be a continuous flow into the reservoir of human powers but mere increase in population unless balanced equally by regular and adequate production to ensure better standard of living will lead to depletion of human powers. Individual countries with the support of many international organisations are doing their utmost to solve these problems, but still the conditions are unsatisfactory inasmuch as their solutions depend on the success in the cultural, political and economic fronts.

International Organisations for Economic Growth

The people in each country, according to their aptitude, cultural heritage and other related factors, develop the resources within the limits set by the environment of the country. Countries are different in respect of social and physical environment, of history, of tradition and of values. Many of these states are tied together by voluntary associations or organisations of international character for political and economic purposes.

Even when the purpose of an organisation is openly political, the member states which are advanced give economic aid and assistance to other member states which are less advanced. Organisations have also been formed for mutual economic gain by member states.

The United Nations is an association of all peace-loving states which has for its objectives the maintenance of international peace and security, and offering co-operation in the political, economic and social spheres towards such ends. One of the principal organs of the United Nations is the UN Conference on Trade and Development, set up in December 1964. The UNCTAD discusses and takes measures to safeguard the interest of members in respect of trade on commodities, manufactures, shipping and finance. Another organ of the United Nations is the Food and Agriculture Organisation which recommends promotion of national and international action for the improvement of production, processing, marketing and distribution in agriculture, forestry and fisheries as well as for the conservation of natural resources.

General Agreement on Tariffs and Trade (GATT) is a multilateral treaty entered into by members of the United Nations for a common code of conduct in international trade. The GATT provides a machinery for reducing and stabilizing tariffs and for regular consultation on trade problems. In recent years, the drive to find solutions to the trade and economic problems of less-developed countries has been intensified. In order to help these countries to sell their exports, an International Trade Centre has been set up in the GATT Secretariat to provide trade information and trade promotion advisory services. Since 1968, this centre is jointly operated by GATT and UNCTAD.

Apart from the United Nations, there are a number of other organisations of regional character to promote growth and mutual aid in member countries.

The European Free Trade Association (known as EFTA), consisting of Austria, Denmark, Norway, Portugal, Sweden, Switzerland and U.K. provides for the gradual elimination of quantitative restrictions, customs duties and charges on industrial products traded between its members.[5] It was formed in 1959. The *Colombo Plan* (1950), whose members are Afghanisthan, Australia, Bhutan, Burma, Cambodia, Canada, Ceylon, India, Indonesia, Japan, Korea, Laos, Malaysia, Nepal, New Zealand, Pakistan, Philippines, Thailand, U.K., U.S.A. and Vietnam, aims at developing the trade of developing economies with advanced countries, stabilising the prices of primary commodities at reasonable levels, and making these and manufactures accessible in world markets. Large scale aids to finance and develop industries are given. Financial and technical assistance is arranged on bilateral basis. Originally it consisted of members of the British Commonwealth constructively interested in South and South-East Asia.

The *Central Treaty Organisation* (known as CENTO) is a pact of mutual defence, in which the members are U.S.A., U.K., Iran, Turkey and Pakistan. The economic programmes include the building of roads, railways and telecommunications, the improvement of agricultural and livestock production, the

[5] The members are sometimes referred to as *outer seven* to distinguish from six of European Economic Community. The actual number of EFTA is now seven with Finland.

expansion of trade and technical assistance, to Iran, Turkey and Pakistan. The *Organisation of American States* (OAS) is an Association of 20 American Republics and consists of Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Hondurus, Mexico, Nicaragua, Panama, Paraguay, U.S.A., Uruguay and Venezuela. The Republics have agreed to co-operate in achieving faster economic and social development. *Latin American Free Trade Association* consisting of Argentina, Brazil, Chile, Mexico, Paraguay, Peru and Uruguay, and *Central American Common Market* consisting of El Salvador, Guatemala, Hondurus and Nicaragua are operating for co-operation in respect of production, tariff and trade.

Six countries of Belgium, France, Federal Germany, Italy, Luxemburg and the Netherlands formed three communities with the object of the progressive economic integration of their countries and as a means towards their greater political unity. These communities are the *European Coal and Steel Community, European Atomic Energy Commission* and the *European Economic Community* (known as Common Market).

The European Coal and Steel Community (1951) is an organisation formed for the purpose of abolishing throughout the territory of member-states all barriers to trade in coal and steel such as tariffs, quotas, and other import restrictions and obstacles to the free migration of coal and steel workers from one member country to another.

The Common Market in Coal and Steel is a means for expanding the economies of the members and to increasingly closer political co-operation among countries, previously divided by rivalries. This has proved that European unification can come through functional approach rather than political approach. Its success led to the creation of *European Economic Community* in 1957. The immediate aim is a common market by gradual elimination of physical and fiscal restrictions on movement of goods, capital and people among member countries, and consolidation of a single external tariff. The European Economic Community has stimulated economic growth, promoted economic stability and raised the standard of living. In January 1972, Denmark, U.K. and Norway and Ireland acceded to the European Economic Community and

to the European Atomic Energy Community to become members from January 1973. Thus there are "big Four" countries in the Community—Britain, France, Germany and Italy. The enlargement of the community will add a new dimension to its economy and indicates the possibility for a European economic and monetary union and also for a joint foreign policy.

The *Organisation of African Unity* has been formed in 1963 by African countries which have got sovereignty recently for furthering African unity and solidarity and among others, for co-ordination of political, economic and scientific policies. Recently, the five states of central Africa—Gabon, Congo, Brazzaville, Chad, Cameroon and Central African Republic have been planning for a *Union of Central African States* in place of the old Equatorial African Customs Union, which urged each state to specialise in the industries it was best equipped for and to sell its products freely through the area.

The *Arab Common Market,* formed in January, 1965 is open to all Arab League States like Iraq, Jordan, Kuwait, Syria, U.A.R., Saudi Arabia, Libya, Lebanon, Yemen and Tunisia and Morocco. It is an agreement which provides for the abolition of customs duties on agricultural products and natural resources within five years by reducing tariff at an annual rate of 20 per cent. The agreement provides also for free movement of capital and labour between member countries.

The *Commonwealth of Nations* is a voluntary association of U.K., Canada, Australia, New Zealand, India, Pakistan, Bangladesh, Ceylon, Ghana, Malaysia and Nigeria. It is not held together by legal ties: trade provides strong ties. Intra-Commonwealth trade is stimulated by tariff preferences, accessibility of London market and by their membership of the sterling area. The member countries derive significant commercial and financial benefits in that London is the most conventional place to borrow as it knows all about the economic conditions in the Commonwealth. Even the dependencies, which are handicapped by the lack of skilled labour, the shortage of investment capital, and the scarcity of low cost power, are now being helped by other members to develop economic resources, through investment and technical aid.

Impact on Underdeveloped Countries

It will be observed that in many cases, the organisations have been facilitated by the similarities and the basic community of interests between nations as in Western Europe (E.E.C.), Africa (OAU), Middle East (A.C.M.). Also, in most organisations, the membership states are the U.S.A. and U.K.—the two most highly industrialised countries of the world, and their association has helped the countries in Asia, Africa and America to develop their economic resources.

The *"United Nations"*, with international partnership of nations, touching hundreds of millions of human beings in every part of the world, has also rendered invaluable service in respect of technical assistance and development of human resources. The United Nations Special Fund is helping nations to help themselves. The water resources are being developed in many underdeveloped countries to bring irrigation, flood control and the electric power and increase the yield of the land. Experiments with desalinization may bring water to the desert and projects in fisheries will increase the harvest from the seas.

The UNCTAD has been giving serious attention to the formulation of principles for commodity agreements, to the ironing out of differences within the developed as well as the developing countries on the question of Tariff preferences and to the softening of the terms of development aid.

Technical assistance activities in the field of economic development are carried out jointly by the United Nations and the specialised agencies under the *Expanded programme of Technical Assistance*. The funds are allocated to a number of international organisations which are engaged in giving assistance of various kinds to countries, needing them.

International Institutions are not above criticism. There is a feeling among the developing countries that they have little voice in deciding how the institutions should function. Since the advanced countries share the main burden of the financial commitments of the institutions, there is not much the spirit of partnership so far as the developing countries are concerned. "Despite general awareness that primary producing countries suffer greatly from instability and deterioration in

terms of trade, there has been no real progress or effective action to ensure that primary producers in the poorer countries get a square deal in international markets." All bilateral aid has been tied to procurement within the aid-giving country and that too for prescribed purposes. Individual donor countries often make far-reaching changes in their aid policies from time to time.

The development of developing countries will depend on international co-operation and national efforts. Capital investment and technical assistance from abroad must be supported by the local people with their skill and knowledge.

QUESTIONS

1. What do you understand by "a natural region"? Into how many natural regions can the world be divided ? Name them and indicate their position in a map.

2. Explain why the people of the Equatorial region are backward in all respects. —(Indian Institute of Bankers, 1957)

3. What is Wet Equatorial forest Region ? Give a detailed account of the Region under the following heads: (*a*) Location, (*b*) climate, (*c*) natural vegetation, (*d*) cultivated crops, (*e*) animal life, (*f*) human life and commercial development. —(Indian Institute of Bankers, 1969)

4. Describe and account for the position of the chief hot desert regions of the tropical zone. Mention any articles of commerce that have been obtained from them.

5. What do you understand by a 'monsoonal' type of climate ? Carefully describe its characterictic products.

6. Mention briefly the characteristic features of the Mediterranean type of climate and indicate the relationship between the climate and the natural vegetation of the Mediterranean region. —(Cal. Inter 1957)

7. "Human life in Equatorial region has not made much progress in economic, social and political spheres." Examine this statement and explain the reasons for the backwardness. (I. I. B. 1971)

8. Explain why in the Mediterranean Regions most of the rains fall in winter months. —(I. I. B. 1968)

9. "Lands of Mediterranean agriculture exhibit many similarities to monsoon regions but there are also striking and significant differences". Explain the statement with examples. —Delhi B. Com. 1960)

10. Describe the monsoon region of the world with special reference to its location, distribution, climate, physical features, natural products, cultivated crops, industries, housing and human life.

—(Indian Institute of Bankers, 1964)

11. How would you divide the different countries of the world on the basis of economic development ?

12. What are the characteristics of the underdeveloped countries ? Can these characteristics remain permanent ? (I. I. B. 1971)

13. Explain how the economic growth of a country is influenced by its association with international organisations of voluntary character.

14. What are the major natural geographical regions of the world ? Discuss the influence of any one of them on human activities ; give suitable examples to illustrate your answer. (I. I. B. 1971)

15. Describe the "tropical monsoon region of the world under the following heads:

(i) Situation and extent
(ii) Climatic characteristics
(iii) Natural vegetation
(iv) Animal life
(v) Human life and economic development

(Delhi B. Com. 1971)

CHAPTER III

WORLD AGRICULTURAL RESOURCES[1]

'actors in agricultural development and Types of agriculture

Agriculture is an industry which is concerned with raising lant life from the soil for the use of mankind. *The object of griculture is to raise stronger and more fruitful crops and lants, and to help their growth by improving the soil and upplying water, when necessary, by irrigation works.* It sometimes practised along with stock-raising, when it is ermed mixed agriculture. It is the most important of all the ndustries in which climate and soil are deciding factors. Although agriculture is one of the oldest of man's activities, there re still many areas where it exists in the most primitive form. t has been estimated that one-sixth of the land surface contains primitive form of *shifting cultivation.*[2] These areas are in he Amazon basin of South America, the wet tropics of Africa nd Indonesia. Another 3·3 per cent of the earth's land area s characterised by a *rudimental system of settled* farming and s mostly found in Indonesia, Africa, Central America and outh America. In *subsistence agriculture,* the main purpose is o grow crops for the use of the growers and not for commerce. uch cultivation is common in many countries of Asia, Eastern urope and Central America. *Commercial System of Crops* ccounts for a little more than 25 per cent of the world's land urface. Commercial farming is both for self-sufficiency and ommerce.

All countries cannot develop commercial farming unless ssociated with certain other conditions. If a region is far rom markets and is without any facilities for transport, it is ot profitable to raise crops there except for local consumption. Nearness to the market and transport facilities are essential

[1] Statistics used in this Chapter are from the Statesman's Year Book 971-72; Trade Year Book, 1970, by F.A.O. (1971); Production Year ook, by F.A.O. (1971): Statistical Year Book, 1970 by U.N.O. (1971).

[2] In shifting cultivation, the people are constantly in search of new lots of land because their older plots lose fertility. Thus there is no ettled cultivation.

to give agriculture a place in any system of national economy. By nearness to the market it must not be understood that the market should be always near from the point of view of mileage. Nearness to the market simply means that all the facilities are present to put agricultural products in certain markets at a reasonable price even though such markets may be thousands of miles away from the producing areas. Cost of labour is another important economic factor. Certain crops like tea and jute requiring a great amount of manual labour and attention cannot be profitably grown unless labour is cheap.

One special feature in connection with any kind of farming is that the fertility of the soil diminishes after each cultivation. Consequently, production decreases year after year unless checked by the application of scientific methods. There cannot be commercial farming on a large scale without scientific applications. The yield of the same crop per acre may vary in different countries because of the differences in skill of the cultivators and in the application of scientific methods.[8]

Cultivation of land may be intensive or extensive in character. Extensive cultivation is practised where the population is small, manufactures undeveloped, trade inconsiderable and the demand for the products of the soil very limited. In intensive cultivation, capital and labour are so applied as to produce the largest possible yield. The soil is carefully drained, and fertilisers are used to render the area more productive. This system is only possible where there is a great demand for agricultural products and it exists chiefly in progressive states.

Cropping Systems

The cropping systems are also different in many countries. In the U.S.A. only *one crop* is raised in a field at a time in a year, whereas in Japan and other countries of dense population, double-cropping is practised. *Double-cropping* means that a field is replanted to a second crop after the first has been harvested. There may be also *multiple* cropping when three har-

[8] Applications of scientific methods have been developed in the U.S.A. The absence of social barriers and the desire for economic gain paved the way for co-operation between scientists and farmers in the U.S.A.

vests are obtained from the same field in the course of the year. Methods of farming are not similar in every country. At present, three different methods of farming are widely used—(*a*) *humid farming*, (*b*) *dry farming* and (*c*) *irrigation farming*. Irrigation farming is practised in those parts of the hot lands where rainfall is seasonal. In India and China irrigation farming is the rule. Canals, tanks and wells have been constructed to supply water to the agricultural fields. Irrigation has converted millions of acres of deserts into smiling fields in many monsoon lands.

There are regions which are beyond the reach of irrigation facilities and which are frequently subject to drought. Neither canals nor tube-wells can supply water to them. They depend wholly on whatever little rain they receive. Hence comes in the importance of dry farming. Dry farming methods were first discovered in the U.S.A., where there are extensive areas receiving less than 20 inches rainfall per annum and having poor irrigation facilities. The following are the prominent features of dry farming : (*i*) ploughing the land in deep soil, (*ii*) terracing the land and division into compartments to allow rain-water to move only under controlled conditions, (*iii*) repeated harrowings before sowings, which conserve soil moisture and destroy weeds.

Humid farming means the production of crops in regions of moderate rainfall without the help of irrigation.

Plantation Crops

Plantation ordinarily means tropical or sub-tropical agriculture which is engaged in producing "planted" trees or bushes which give yields over a period of years. These are long-cycle crops. The products of the plantation agriculture in the Tropics and Sub-tropics are coffee, tea, cinchona, rubber, pineapples, bananas, tobacco, cocoa and cotton. A plantation requires a large unit or an estate so that production of a single-crop can be raised on an extensive scale by efficient methods and in standard forms for the purpose of export. In most cases, such plantations are managed from distant headquarters. The word 'plantation' is also used to denote those farms of the tropical lands where the capital, the skilled personnel, the

machinery and sometimes even the labourers are brought from outside. Thus, sugarcane in South Africa with indentured labour, cotton in the U.S.A. with slave labour and tea gardens in India of foreign ownership were taken as example of plantations in the past.

The commonly accepted concept is that a plantation is a large unit, produces a single crop which is important for the economy and employs a large volume of labour.

Agricultural Development and population growth

There is a close relationship between agricultural development and population growth. World can feed many times present population became many unused but potentially usable land is still to be brought under cultivation. One estimate that world feed 4,700 million people at American standa

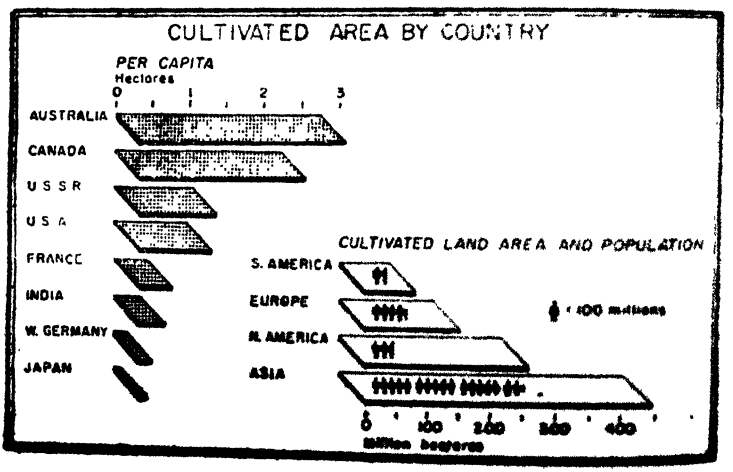


FIG. No. 4. Cultivated Areas of the World.

and 157,000 million at Japanese standards. But if the rate of growth of population continues at 2 per cent a year, the world's population will be 157,000 million in 185 years. Unless hunger and poverty are to be accepted as facts of life in the developing

countries of the world, the need for rational utilisation of land along with population control has become most urgent.

On the basis of 1970 statistics, the percentage of cultivated land to the total area of a country is the highest in Poland (49) Italy (49), India (38), Spain (37) and France (36). The lowest percentage is in Australia (2), Canada (3), Soviet Union (8), and Argentina (9). Since the countries are of different size, this percentage at best gives the relative importance of agriculture in a particular country. In terms of world's total cultivated land, U.S.A., Soviet Union and India account for 50 p.c.

The ratio of cultivated land to the total land area of a country is determined by the physical features like drainage, level and soil and climate. The low ratio is, therefore, no indication of its backwardness or future possibilities for expansion. Most of the world's agricultural resources are produced on only 7·5 per cent of the earth's land surface (excluding the Antarctic) and more than three fourths of the world's cultivated land is located in only 15 countries with 52 per cent of the world's population. At least 40 p.c. of the earth's land surface is utilizable for agriculture, thanks to the steady progress of science.

It is estimated that in 1970, agricultural population constituted about 50 p.c. of the world's total population. The percentage of agricultural population to the total population of a country depends on the extent to which the country has developed its other industries. The great industrial countries generally have a low percentage of agricultural population. The use of mechanisation can also reduce the percentage of agricultural population. The percentage of agricultural population in 1968 in some selected countries were as follows : U.S.A. 9 ; U.K. 6 ; U.S.S.R. 50 ; Japan 36 ; India 68 ; West Germany 10 ; France 20 ; China 70 ; Sudan 87 ; Nyasaland 92 and Turkey 70.

High percentage of agricultural population in many underdeveloped countries has given a feeling among them that overdependence on agriculture keeps a country weak and poor and that industrialisation alone can make a country economically and politically strong. What is not taken notice of seriously is the fact that a nation's prosperity can come from many kinds

of economic enterprises and that a nation with large population need not think in terms of industrialisation only. The food supply in the world has become critical because of the neglect of agricultural industry in underdeveloped countries. There is considerable scope for improvement of agricultural methods in all countries, and more so in the developing countries. In fact, in recent years, India has brought about a sort of "green revolution" in food crops by the use of better seeds, better implements and better farming methods. Agricultural industry, however, may not present a uniform pattern of its operations in all countries. Nor is it possible to have a uniform universal pattern. There is a craze for introducing mechanisation in agriculture like advanced countries. Each country should

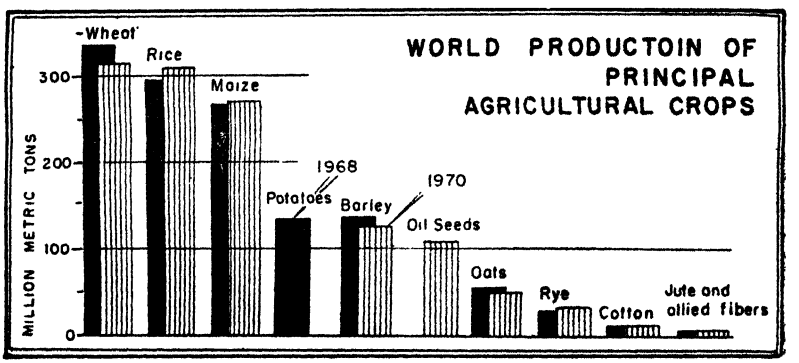


FIG. No. 5. Note the overwhelming importance of wheat, rice and maize in respect of production among all principal agricultural crops.

develop agriculture to suit its own requirements and its pattern of economy. Mere imitation of advanced countries will not result in higher productivity. However, there are certain basic universals in agriculture which any country can apply like agricultural experiment stations, application of science to effect high increase in agricultural production, treatment of soil for proper crops, research for better plants, scientific protection of crops from disease and insects, use of fertilisers, use of irrigation, institution of co-operative and proper land tenure. These devices any country can apply to meet its own needs.

PRINCIPAL AGRICULTURAL CROPS IN THE WORLD
(in 1000 metric tons)

	1968	1970
Wheat	332,539	311,615
Rice	295,436	306,817
Maize	265,015	266,790
Barley	136,941	128,511
Potatoes	135,674	—
Oats	55,496	52,611
Oilseeds	—	110,000
Cotton (Lints)	11,370	11,350
Jute and allied fibres ...	2,678	3,713

According to a study, "agricultural commodity projections, 1970-80", carried out by UNFAO, world agricultural production is expected to rise by 28 p.c. and agricultural demand by 26 p.c. between 1970 and 1980. Since agricultural production is for domestic consumption or export or both, there is the constant need for adjustment between demand and supply. More so, when the factors that determine the size of demand are always changing. The rate of growth of population, introduction of substitutes, changing habits and tastes in consumption, and consumers' incomes have their impact on the prices of supplies. Fluctuations in production are caused by natural conditions, price structures and presence or absence of technological improvements. Not less is the importance of tariff in the trade of commodities between countries.

Although there are many different crops which are raised in the world, only about fourteen of them have large production for trade. These are wheat, rice, maize, barley, oats, oilseeds, cotton, jute, rubber, tea, tobacco, coffee, sugarcane, and cocoa. Expansion and improvement in agricultural production in most countries of the world centre around these crops. The largest share of the gross national product of all developing countries and of many developed countries originates from agricultural industry.

One distressing feature of the agricultural industry is the risks and uncertainties associated with the production. Lack of moisture and drought, excess moisture and floods, frost, hail,

storms and diseases are the natural hazards for agriculture. "Modern Science and technology have helped and will continue to help eliminate or reduce many of these risks. Yet even the most developed countries cannot tame nature in order to fully protect farming and investment, and natural forces are often responsible for large-scale loss of life and property". While insurance against hazards in agriculture is quite common in advanced countries, the developing countries have taken notice of it only recently. Also, International Bank for Reconstruction and Development has been considering the possibilities of an international crop insurance system to "help protect agricultural investments and encourage production in areas where people are underfed".

CHIEF AGRICULTURAL RESOURCES

The agricultural crops may be classified into five groups: (*a*) cereals: wheat, rice, maize, rye, oats, millets and barley ; (*b*) beverages and tobacco: Tea, coffee, cocoa and tobacco ; (*c*) sugar cane, sugar beet, spices and fruits ; (*d*) fibres: cotton, jute, hemp and flax ; (*e*) rubber and oil seeds.[4]

Distribution of World Cereals

Wheat :—The importance of wheat as one of the most popular of human foods springs from a number of reasons. Not only is it economically produced and its carbohydrates and proteins well-balanced, it can also be cultivated in a variety of climates and can be stored as whole grain or as flour for a comparatively long time. The greatest portion of the wheat crop is manufactured into flour. Large quantities of starch are also made from it. The straw is used for fodder, for bedding, in stables and also in the manufacture of straw board and the cheaper grades of wrapping paper.

Wheat plant belongs to the order of grasses and grows usually to a height of three feet. Several erect stems rise from

[4] This classification is on the basis of uses, and not on climate which the deciding factor for growth. It can also be classified as foods, nonod crops, fibres and vegetable oils.

the root of the plant, and the grains grow at the end of each such stem.

Conditions of Growth

Though wheat is a product of the temperate zone a significant portion of the crop is cultivated in steppe climates. Climatic conditions are very important for its production. In the early stages of growth it requires a fair amount of moisture with cool weather to be followed by warm and sunny weather

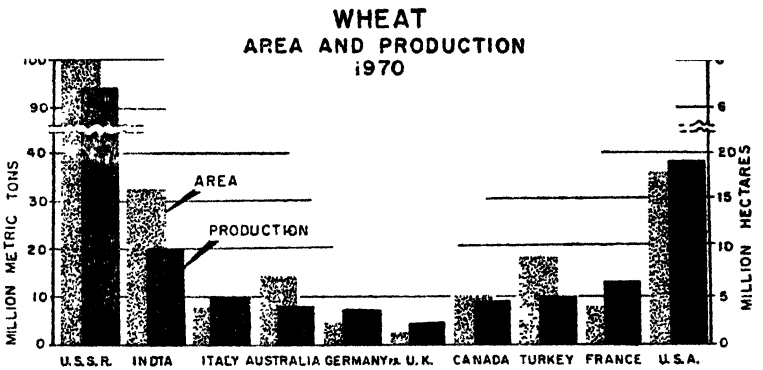


FIG. No. 6. U.S.S.R. which was behind the U.S.A. in wheat production a few years ago, now occupies the first position. Note also the higher yield in the U.S.A. in terms of acreage than that of U.S.S.R.

without any rain. Just before the ripening of the grains, a little rain is helpful, but when it is ripening, clear and bright days are required. Most of the world's wheat regions have an annual precipitation not exceeding 40 inches.

In general, the best wheat soils of the world are heavy and dark in colour and of high fertility. Level land is highly favourable to extensive farming, as it permits the use of machinery necessary for modern wheat farming on a large scale. The lower temperature limit for wheat cultivation is 57°F for summer months with no high temperature limit. It does not do well, however, in regions where heat is combined with high humidity. The hot and humid climate of the tropical area is hostile to wheat cultivation.

Of late, progress in agricultural science and improvement in farming have made it possible to bring many unfavourable lands under wheat cultivation. Economic factors in wheat production have wrought great changes in a few decades. Introduction of farm machinery, adoption of scientific methods and improvement in transport have caused rapid expansion of wheat farming in the sparsely populated plains of Central North America, South America and Australia. Economic factors have not reached the same standard and do not work on the same basis in all countries. Thus the yields of wheat per acre vary greatly from country to country.

The other factors which encourage or discourage wheat cultivation are as follows: (*a*) Wheat may be neglected even when the conditions are favourable for its cultivation if other crops are more desirable or fetch better prices; (*b*) a government may decide the maximum acreage under each crop as was done in the U.S.A. in 1954; (*c*) a government may encourage greater cultivation of wheat even with subsidies if the national interest demands such a step; (*d*) import duties on wheat in the consuming countries will discourage the extension of wheat cultivation in the countries which produce for export.

Because of the geographical situation of the different countries wheat is harvested in every month of the year. This factor, along with the remarkable development of transportation facilities, has resulted in an equalisation of prices in the wheat markets of the world.

TIME OF SOWING AND HARVESTING OF WHEAT IN DIFFERENT COUNTRIES OF THE WORLD

Country	No. of Harvests	Sowing Season	Harvesting Season
Argentina	... 1	April-August	November-January
Australia	... 1	April-June	October-January
Canada	... 2	(a) August-September	(a) July-August
		(b) April-May	(b) August-September
U.S.S.R.		(a) August-November	(a) July-September
		(a) Sept.-October	(b) August-September
U.S.A.		(b) April-May	(a) May-July
Indian Union		October-December	(b) August-September
Pakistan		October-December	March-May
			March-May

Many varieties of wheat are grown in the world of which winter wheat and spring wheat are the most important. About 75 p.c. of the total acreage under wheat is devoted to winter wheat. The time of sowing winter wheat is from August to October, and the harvesting begins in late spring or early summer. Spring wheat on the other hand is sown in the spring and harvested in autumn.

It will be observed from the table below that the highest yields of wheat come not from the wheat regions of the world, but from North-West Europe, which is normally a deficit area.

INTERNATIONAL COMPARISON OF PRODUCTIVITY OF WHEAT
1967-68: 100 KG. PER HECTARE

India	8.9	Italy	23.9
Japan	27.2	Belgium	41.4
Asia	9.6	Netherlands	47.9
U.S.A.	17.4	Australia	8.3
France	36.3	New Zealand ...	37.3
Germany (W) ...	41.2	World	13.4

WHEAT : AREA AND PRODUCTION

Country		Area (1000 hectares) 1969	Area (1000 hectares) 1971	Production (1000 metric tons) 1969	Production (1000 metric tons) 1971
France	...	4,034	3,760	14,459	15,067
West Germany	...	1,494	1,548	6,000	7,106
Italy	...	4,218	4,142	9,585	9,874
Rumania	...	2,759	—	4,349	5,000
U.K.	...	833	1,091	3,364	4,868
U.S.S.R.	...	66,426	—	79,917	99,500
Canada	...	10,104	7,781	18,623	14,198
U.S.A.	...	19,253	19,570	39,740	44,249
Argentina	...	5,191	—	7,020	—
India	...	15,958	17,892	18,652	23,247
Turkey	...	8,743	—	10,593	12,600
Australia	...	9,486	—	10,546	
China (Mainland)[6]				28,500	30,000
World total		221,522	218,000	315,462	340,200
Regional totals					
Europe	...	28,263	28,200	70,771	78,300
North America	...	29,357	27,300	58,363	58,500
Near East	...	20,653	20,200	21,452	22,200
Far East	...	23,437	25,300	26,961	31,300

[6] No authentic data are available about wheat production of China (Mainland), and the estimates vary between 20 and 30 million tons a year.

Although more of the world's population take rice as the main diet, the wheat production exceeds rice production. Naturally, shortage of food supplies in rice producing countries is the main problem today. Also, it is estimated that one-tenth of the land surface of the world *can* produce wheat on the strength of climate, topography, and soil. In actual practice, however, only one-eighth of this potential area is under wheat cultivation. The following is the relative position of the different countries in respect of wheat production in 1970.

U.S.S.R. is the largest wheat producer in the world, although its per hectare yield is much lower than that of the U.S.A. This suggests that U.S.S.R. can raise its production still further with improvements in the farming methods. U.S.A. has decreased appreciably its area under wheat cultivation from what it was in 1948-52, but the production went upto 44 million metric tons in 1971 from 31 million metric tons in 1948-52. India was the fourth largest wheat producer in 1971 with her production of a little more than 23 million metric tons. India's production in 1948-52 was only 6 million metric tions. With an increase of 80 p.c. in the area in 1971 from that of 9 million hectares in 1948-52, the production increased b about 4 times in 1971.

Trade in Wheat

Of the total production of wheat, only about 18 to 20 p. is meant for export and the rest is consumed in the producing countries. The chief wheat exporting countries of the world are the U.S.A., Canada, Australia, France and Argentina. Tl occasional exporters are Netherlands, Sweden and U.S.S.R.

WHEAT EXPORTERS (in million tons.)

	1966	1967	1970
U.S.A.	... 22.4	... 17.4	17.4
Canada	... 14.5	... 9.5	10.7
Australia	... 44	... 8.1	7.7
France	... 3.6	... 2.0	3.4
Argentina	... 5.0	... 2.0	2.3
World Total	... 56	... 62	43.1

Home consumption being great, China and India cannot export wheat to other countries. Although wheat is cultivated widely, export of wheat ordinarily comes from only a few countries. About 42 p.c. of the wheat in international market comes from U.S.A. In fact, U.S.A. is the single largest wheat exporter of the world. Canada, Argentina and Australia produce only about 12 p.c. of the world's total wheat. Their production, however, is far in excess of the requirements of their 57 million people. Consequently, they are also large surplus wheat growing regions in the world. It is interesting to note that before the World War II Canada led the world in wheat export ; now it is the U.S.A. because of her involvement in economic aids to many countries. Her increased production and her handling of much Canadian wheat for export have helped her to retain this position.

There is great demand for American wheat in West European markets. Of the total exports of wheat from the U.S.A. about two-thirds go to Europe and one-fourth to Asia. Before the outbreak of the second World War, the U.S.A. was an insignificant exporter of wheat with an average of a little more than half a million tons of wheat a year. During the post-war period, however, because of the non-availability of wheat from Hungary, Bulgaria and Rumania the whole of Western Europe depended on the U.S.A. Even though the economic conditions of Western Europe have become normal, the role of the U.S.A. as its supplier of wheat will continue.

PRINCIPAL WHEAT IMPORTING COUNTRIES
(in '000 metric tons)

		1059	1965	1966	1970
U.S.S.R.	...	247	3,052	8,030	—
Czechoslovakia	...	1,638	1,365	1,043	1,026
Poland	...	1,313	1,673	1,567	1,104
U.K.	...	4,344	4,004	4,347	4,928
Brazil	...	1,820	2,176	2,420	1,958
India	...	3,545	4,007	7,760	3,425
Japan	...	2,412	3,178	3,917	4,685
World Total	...	30,029	37,177	56,511	34,000

One recent feature in the wheat trade is its steady decline of export. In 1968, the total export was 38 million metric tons and in 1969 it was 35 million metric tons. Similarly, in respect of total import of wheat, there is a distinct downward trend after 1966.

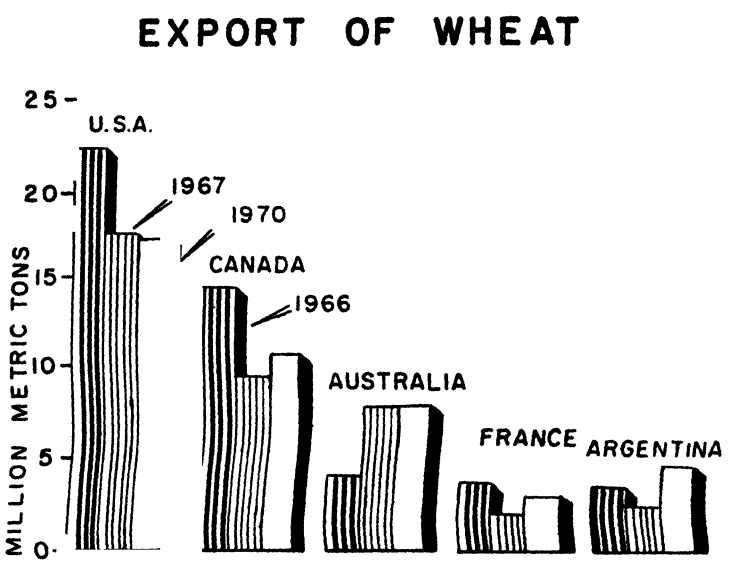


FIG. No. 7. Except Australia and Argentina, most exporting countries indicate a downward trend.

Principal Growing Areas

From the point of view of production, the U.S.A. is the second largest wheat-producing country and the raising of this crop is carried on in Montana, Kansas, North Dakota, Nebraska, Oklahoma, Illinois, Washington, Missouri, Minnesota, Ohio and some other States. Montana, North Dakota and Kansas supply more than 5 million tons of wheat each. Between North Dakota and Minnesota, extending into Canada, is the Red River Valley, which is such a prolific wheat-producing country that it is known as the 'Bread basket of the world'. The great wheat centres are Minneapolis, Duluth, Chicago, and Buffalo. The Pacific States were once the important

producers of wheat. Before the Civil War, the centre of wheat cultivation was the Appalachian Valley. Between 1859 and 1907, the cultivated area extended to the Prairies and the north-west. This extension of the wheat belt westward and northward was possible because of the development of new varieties of wheat and innovations in methods of cultivation. To avoid the danger of unjustified encroachment on grazing area by the extension of wheat areas and also of over-supplying

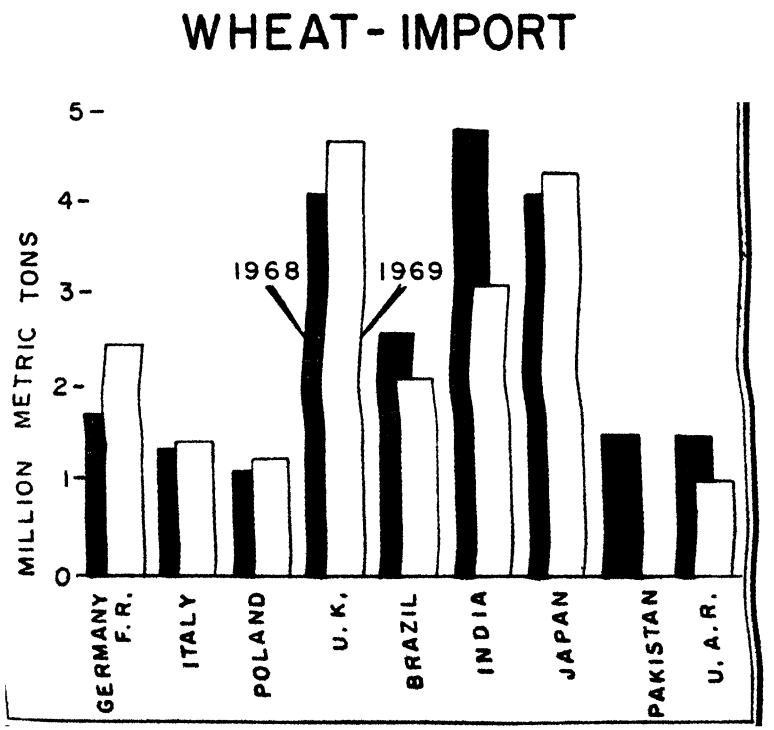


FIG. No. 8. Note the decline in India, Brazil and Egypt and the increase in U.K., West Germany and Japan.

the markets, a system of established rotation—corn and live-stock—was introduced. In recent years the production of wheat has decreased because fruit-farming has proved more profitable in these areas. Though U.S.A. has a population of more than 205 millions, its agricultural operations are highly

mechanised and need hardly 10 per cent of its population to carry them on for internal consumption and export.

Another interesting fact is that the increased wheat production has been possible without bringing additional areas under its cultivation.

Normally Soviet Union raises more than 90 million tons of wheat a year in about 68 million hectares of land and is stronger than U.S.A. in this regard. From 64 million tons in 1960, the Soviet Union raised the production to 99 million tons in 1970. The Russian Wheat Belt is the largest in the world, extending as it does from the Carpathian Mountains to Lake Baikal, a distance of 3000 miles with an average width of 400 miles. Wheat is cultivated both in spring and winter. Spring wheat accounts for about 65 per cent of total wheat acreage. The main regions of spring wheat are the Volga region, the trans-Urals, the Kazak and the Ukraine. Winter wheat is cultivated in the Ukraine, the North-Caucasus and Crimea. The rapid extension of wheat lands is due to a more intensive system of work, the mechanisation of agriculture, and to more healthy conditions of work on collective farms. Kherson and Odessa on the Black Sea handle the bulk of the export trade in wheat. The other important wheat centres are Moscow, Gorki and Orenburg. Of late, U.S.S.R. has assumed the role of an exporter in wheat. Although, U.S.S.R. exports about 3 million metric tons of wheat a year to East European countries, she is also a heavy buyer of wheat. She imports about 8 million tons of wheat a year.

Excellent transportation facilities, comparatively small population, commercialised farming, and the superior quality of wheat have made Canada a great exporter of wheat. Her wheat lands are Manitoba, Saskatchewan, Alberta and Ontario. Winnipeg and Port Arthur are great centres of wheat production in the Dominion. Decreasing fertility of land in Manitoba and Saskatchewan, and the opening of railways in the west are factors responsible for the shifting of wheat cultivation to further west, *i.e.* Alberta. Canadian wheat is exported through New York (40 p.c.), Vancouver (25 p.c.), Montreal (15 p.c.), Halifax, St. John and Portland. Europe normally imports 50 p.c. of Canadian wheat. The United Kingdom alone takes about 40 p.c. of Canada's total exports of wheat. Eastern

Europe, China and Cuba take from Canada 45 p.c. of the country's wheat exports. Canadian wheat has not succeeded in penetrating into many markets because of a more aggressive marketing programme by the U.S.A. This competition is felt most in the Japanese market. Also, increased production of wheat in many parts of the world has reduced the export demand for Canadian wheat. Farmers are planting other crops, particularly rape seed, to feed the increasing numbers of cattle and hogs.

China (Mainland) which is a large producer has about 26 million hectares of land under wheat cultivation. Wheat production in 1970 was estimated at about 30 million metric tons which proved inadequate for the requirements of the country. She imports about 6 million tons of wheat a year. The purchase of wheat from Canada, Australia and other sources as well as fertilizers and fertilizer manufacturing plants indicates the country's desperate efforts to solve the problem. The Yangtze lowland region, the Red Basin of Szechwan, the Great Plain of North China, and the loess highlands are the wheat producing areas.

Normally wheat cultivation is not possible in the Monsoon tropics, yet in cooler section wheat is cultivated as a "winter crop". The north-western areas of India and the West Pakistan produce large quantities of wheat. In fact, with about 23 million tons of wheat production in 1971, India is at present the fourth largest wheat producing country.

Trend in Production and Commerce

Although the population of the world is growing and consumption is increasing, the improved methods of production and the utilization of available areas in Australia, U.S.S.R., China and in some parts of South America have also increased the supply of wheat more rapidly than the demand. It is estimated that in Australia about 200 million acres of land are suitable for wheat cultivation. At all events, there is ample room for wheat expansion in Australia, U.S.S.R., China and South America.[6]

[6] It is estimated that one-tenth of the world's land surface is within the limits of wheat production.

Within recent times, there has been an increasing extent of government interest in production and trade of wheat in many countries. The rapid pace of technical advance and the application of the results of scientific research to production techniques have also brought about great changes in acreage, yield per acre and total production. The dominant feature of the world wheat situation is the persistent efforts to keep production in excess of effective demand.

An international wheat agreement exists and has been formed by forty-two importing and six exporting countries as members to bring about a rational marketing procedure in the interest of members. The agreement covered about 90 p.c. of the world wheat trade.

All important exporting countries except the U.S.S.R. have joined a new agreement makes extensive changes in respect of both the price mechanism which is to be observed and provisions aimed at easing the problem of wheat surpluses. Each importing member country undertakes to buy from exporting countries a specified percentage, which varies from country to country, of its total commercial purchases of wheat. Exporting countries undertake that wheat shall be available at prices in quantities sufficient to satisfy the commercial requirements of importing countries. The Wheat Council reviews annually the world wheat situation, including production, stocks, prices, and the disposal of surplus supplies. To assist in its review of surplus disposals, exporting and importing countries inform the Council of the measures taken by them to secure compliance with the following principle: that the solution of surplus disposal problems should, wherever possible, be sought through efforts to increase consumption ; that disposals should be made in an orderly manner ; and that disposals under special terms should be made without harmful interference with patterns of production and international commercial trade.

Rye :— It has been cultivated in Asia and Europe from time immemorial and for centuries it has been one of the most important food plants. It is also used for the preparation of 'rye whisky' and other strong liquors. The straw is used for making horse-collars, mattresses, baskets and straw hats.

Conditions of Growth

Rye is distinctly a crop of cool and moist climate. It thrives in fertile as well as in poor lands. The principal rye-producing countries are the U.S.S.R., Germany, Poland, Czechoslovakia, Turkey, U.S.A. and Argentina. The yield of rye per acre is higher in European countries than in the U.S.A. and Canada.

YIELD OF RYE IN CERTAIN PRODUCING COUNTRIES, 1967

(100 kg per hectare)

Countries		Countries	
Netherlands	32	Poland	18
Sweden	32		
Germany (W)	32	U.S.A.	14
Czechoslovakia	22	Canada	12

RYE: AREA AND PRODUCTION

Country	Area (1000 hectares) 1968	Area (1000 hectares) 1970	Production (1000 metric tons)	Production (1000 metric tons)
West Germany ...	962	864	3186	2663
East Germany ...	735	670	1936	1474
Poland ...	4263	3500	8438	6100
U.S.S.R. ...	12269	11000	14120	15000
U.S.A. ...	410	601	594	979
Czechoslovakia ...	337	219	769	575
World ...	22331	19983	33365	30753

The world production of rye in 1970 was about 31 million metric tons compared to 37 million metric tons in 1948-52. In respect of area also, there was a decrease from 39 million hectares in 1948-52 to about 20 million hectares in 1970. Despite a considerable reduction in area, the production has not declined to the same extent. This has been possible because of improvements in the farming methods and the need for maintaining correct balance between supply and demand.

Growing Areas and Trade

The continent of Europe produces and consumes more than 95 per cent of the world's rye. This belt stretches from the Eastern Netherlands across the Baltic plain of Northern Germany and Denmark into Poland and from there across the central part of European Russia, ending eastward against the Urals. In U.S.S.R. nearly 50 per cent of the total crop of the

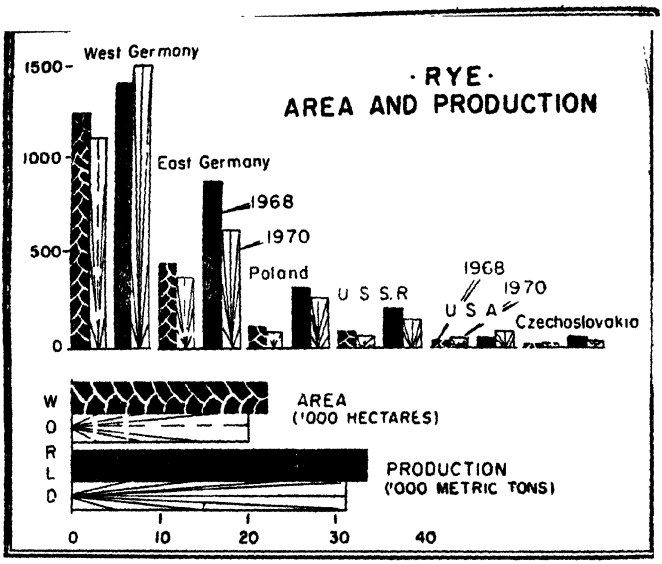


FIG. No. 9. Rye: Area and Production.

world is raised. As rye is less exacting than wheat in regard to climate and soil, it has a wide distribution in Russia and is raised further north than any other grain crop. About 20 million hectares of land are under rye cultivation, and the regions are R.S.F.S.R., Ukraine, Byelorussia, trans-Caucasia and Kazakh. The average yield of rye is 2000 kg. per hectare. West Germany and East Germany raise about one-sixth of world production. About 80 p.c. of the production of North America comes from U.S.A. which has about half a million acres under rye cultivation. The only producer of rye in Asia is Turkey. In South America, 98 p.c. comes from Argentina. Rye is essentially a crop grown for home consumption, and the inter-

ıational trade in the commodity is very small. U.S.A. and anada export a portion of their limited crop and there is ome movement from the greater producers of Scandinavia and ıther European countries. Argentina once an important exporter has an uncertain exportable surplus today.

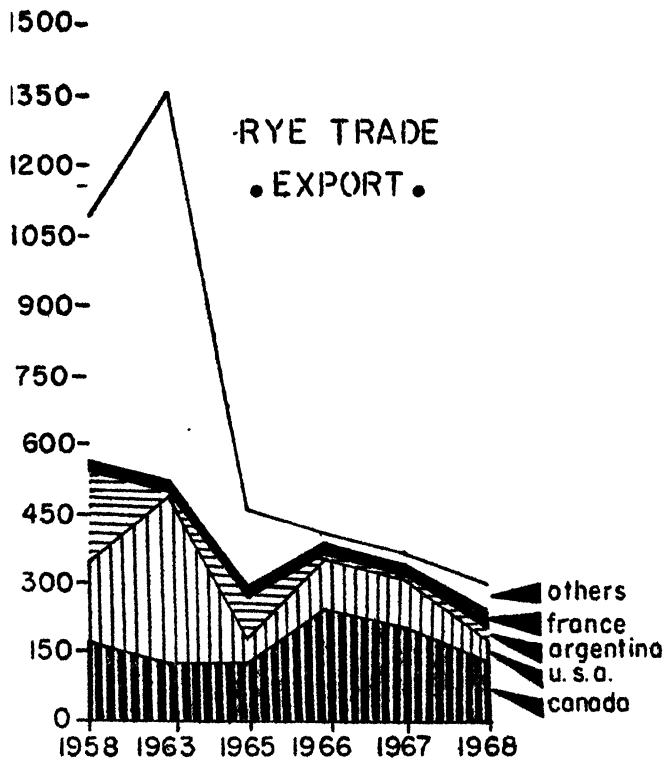


Fig. No. 10. Rye Trade Export

Rye is an example of a commodity which has a diminish- trade. From 1 million tons of export in 1960, the figure come down to only 238,000 tons in 1969.

The principal importers of rye are Netherlands, Poland, den and East and West Germany. West Germany accounts about 50 p.c. of the world's total import of rye.

Barley :—This cereal is a bread grain and also a commo ration for horses, cattle and pigs. Barley is used for thickenin soups and also for the manufacture of beer and whisky.

Conditions of Growth and Growing Areas

In general appearance and manner of growth, barl resembles wheat. It requires high quality soils and cannot grown in soils which are sandy, poor or infertile. Its growi season is the shortest of all grains. Among its many varieti some thrive best in the warm temperate lands and some a cultivated farther north than any other cereal crop. Becau of its short season, barely can be grown also even near t Polar region as in Finland, or at an elevation as high as 15,0 feet, as in Tibet and the Himalayas, or in the drylands as the northern edge of the Sahara desert. Barley grows best i the Mediterranean regions during the winter months, where is an important foodgrain because the region is too dry f summer wheat production and too cool for winter whe production.

The world's barley crop is a little less than one half wheat. Europe has approximately about 25 p.c. of wor acreage and one-third of production. In Europe, it grown rather extensively in eastern England, on the islands eastern Denmark, through central and southern Germany, a Czechoslovakia. Soviet Russia has 21 million hectares und barley crop. Barley is mainly cultivated in Ukraine, Nor Caucasus and also in the strip of territory between the Sea Azov and the Caspian Sea.

Barley is less important than wheat but its production on the increase in most countries. From 59 million tons 1948-52, the volume has gone up to more than 152 million t in 1971. The increasing demand for baby foods and beer, and whisky is responsible for the upward trend in producti

The yield per acre of barely is highest in the intensiv cultivated countries of North-West Europe. In America, cu vation is extensive rather than intensive and yields are ac ingly lower than in Europe.

BARLEY: AREA AND PRODUCTION

Country	Area (1000 hectares) 1969	1971	Production (1000 metric tons) 1969	1971
Denmark ...	1,305	1,383	5,255	5,498
France ...	2,859	2,688	9,452	8,888
West Germany ...	1,387	1,494	5,130	5,671
Spain ...	2,170	2,268	3,969	4,611
U. K. ...	2,413	2,304	8,664	8,798
U. S. S. R. ...	—	21,000	—	38,000
Canada ...	3,859	6,154	8,238	14,284
U. S. A. ...	3,858	4,131	9,222	10,231
India ...	2,758	2,597	2,424	2,865
Turkey ...	2,687	—	3,740	4,000
WORLD ...	78,031	81,700	137,122	152,500

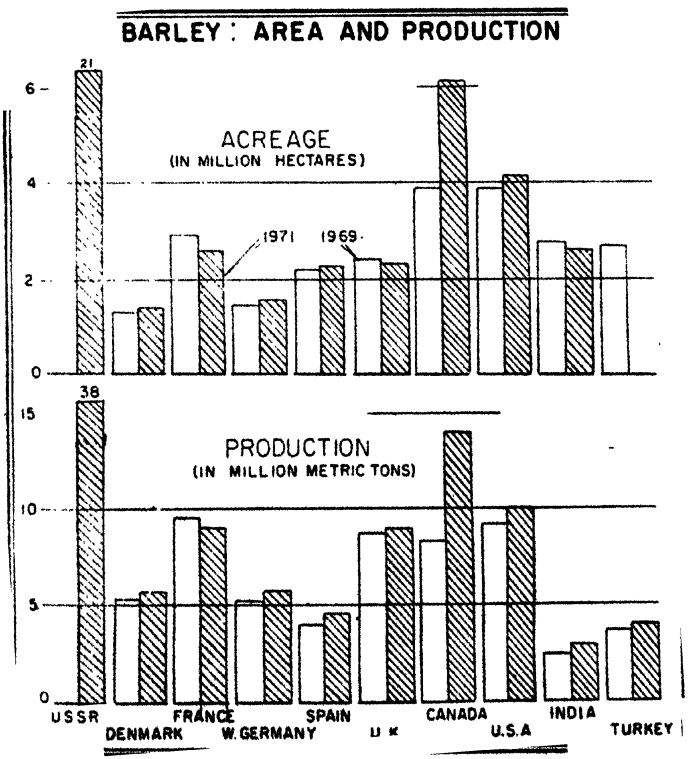


FIG. No. 11. Barley: Area and Production

The chief factors on which the yield of barley depends are soil, moisture, supply and quality of seed and method of cultivation. India and Australia have the lowest yield per hectare so far as barely is concerned. Barley is grown in every province of Canada, but Manitoba and Ontario are the leaders.

Trade in Barley

Barley is exported from U.S.A., France, Argentina, Canada and U.K. Spanish and North African barley is in great demand in U.K., for the manufacture of ale. The most notable trend is the rapid decline of export of barley from the U.S.A. From the first position in export upto 1960, it now occupies the fourth position.

EXPORT OF BARLEY

(In thousand metric tons)

		1968	1970
Denmark	...	356	280
France	...	3,153	3,071
West Germany	...	134	574
Canada	...	657	2,988
U.S.A.	...	143	1,159
U.K.	...	10	112
GRAND TOTAL	...	5,769	9,486

France has increased in recent years her export of barley considerably and has the top position in the export of barley. This is related to her increased production. Argentina, on the other hand, in spite of larger production, has been exporting less. U.S.S.R. exports about two million tons of barley.

The principal importing countries are West Germany, Italy, Spain, Poland, Netherlands, Japan and U.S.A.

IMPORT OF BARLEY

(In thousand metric tons)

		1968	1970
West Germany	...	1,324	2,074
U.K.	...	651	1,211
Poland	...	375	1,094
Japan	...	677	677
Netherlands	...	149	169
WORLD TOTAL	...	6,234	8,752

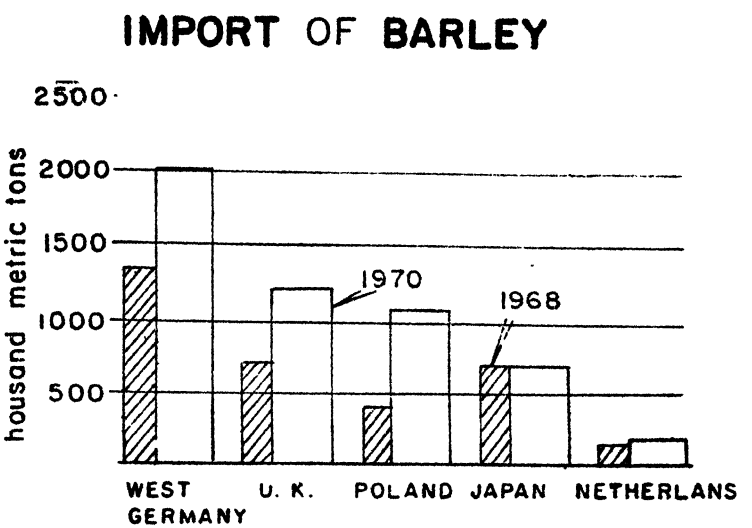


FIG. No. 12. Import of Barley

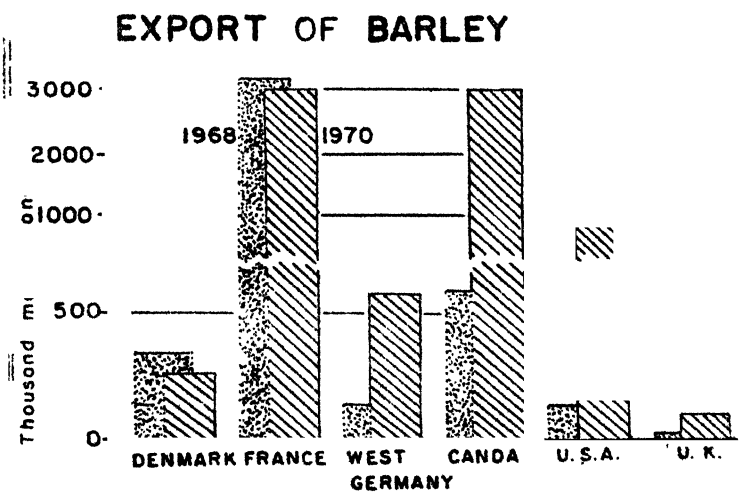


FIG. No. 13. Export of Barley

Oats :—It is another cereal crop of the world, but th grain is usually grown for home consumption and is less in portant in world commerce than wheat. It is chiefly used a food for cattle and horses, and also for human consumption.

Growing Conditions, Areas and Trade

Oats thrive well in a cool, moist climate and are, therefore generally grown in the northern parts of Europe and Nortl America. Broadly speaking, oats cultivation is practised i lands (*a*) with cool, moist and damp springs and summers (*b*) that are cool and moist at all seasons, (*c*) during earl spring if they are long-summer lands, and (*d*) in the autumr and cool periods of the year if the lands are in the Humic Sub-Tropics.

The world production of oats in 1967 came down fron 62 million tons in 1948-52 to 51 million tons because o

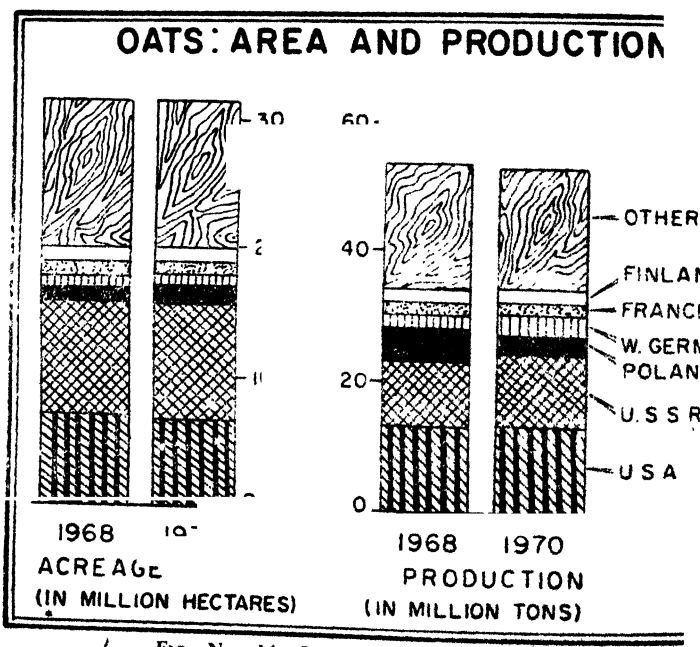


FIG. No. 14. Oats: Area and Production

decrease in production in U.S.A. and U.S.S.R. The wor average yield per hectare is 1600 kg.

OATS: AREA AND PRODUCTION

Country	Area (1000 hectares)		Production (1000 metric tons)	
	1968	1970	1968	1970
U. S. A. ...	7,095	7,519	13,634	13,201
U. S. S. R. ...	8,998	8,500	11,639	11,000
Poland ...	1,365	1,500	2,831	3,300
West Germany ...	821	825	2,893	2,484
France ...	949	799	2,528	2,070
Finland ...	489	524	1,064	1,330
WORLD ...	32,204	31,979	54,205	52,611

YIELD OF OATS IN CERTAIN PRODUCING COUNTRIES (1963)

100 kg/hectare

United Kingdom ...	34	France	27
Canada ...	16	Italy	16
Denmark ...	37	Rumania	13
Netherlands ...	42	U. S. A.	18
Germany (W) ...	34	Argentina	13

The U.S.A. raises about 13 million tons and accounts for more than 28 p.c. of the world production. She occupies the first place in the list of oats producers. Before the World War II, the U.S.A.'s production was a little less than 60 p.c. of Soviet Russia's production when the latter raised 20 million tons. The position has changed not because the production has gone up very much in the U.S.A., but because it has come down in the case of U.S.S.R., which produced only 11 million tons in 1967.

The international trade in oats is extremely small as the chief producers (with the exception of Argentina and Chile) grow it mainly for home consumption. Nevertheless, in recent years the U.S.A., Canada and Australia have placed considerable quantities in the foreign markets. Of the total production of 52 million tons in 1970 only about 1 million tons of oats are exported. Sweden exported 208,000 tons, U.S.A. 15,000 tons and Australia 34,000 tons. The chief importing countries are West Germany, U.K., Italy, Switzerland, France and Denmark. In other words, Europe takes about 95 p.c.

Rice :—Rice has a very long history of more than 4,000 years. The region stretching from Southern China to lower Gangetic Valley is thought to be the birth-place of rice. It forms the principal food of one-half of the population of the world. A kind of distilled liquor in India and a number of intoxicating drinks in China and Japan are also made of it. Sandals, hats and various other articles are made from the straw; the husk is used for filling mattresses and in packing goods. It is also mixed with cement for building *sound-proof* walls.

Rice is grown on a variety of soils, but a free loam allowing root development with a heavy clay sub-soil to retain water is the most productive. It thrives in regions of high temperature and heavy rainfall. During the growing season, temperature should not be less than 75 degrees. It is seldom raised where the annual rainfall is less than 45 inches. During its period of growth rice requires 45 to 60 inches of water and in the very hot areas up to 70 inches. It demands swamp conditions and during a considerable part of its growth it must be flooded. Rice soils should be loams with a high silt and clay content so that rain-water may not drain away to underground outlets. Level lands, especially the alluvial soils of the river valleys and deltas, are, therefore, essential for rice cultivation.[7]

Though rice plants look the same in nature, there are many species in the world today with different native characteristics, requiring different growing periods. The rice plants of one region, therefore, may not flourish in another region. Rice is broadly classified into Japonica and Indica types—the former a crop of high latitudes and the latter of low latitudes. They also differ in regard to absorption of fertilizers. When fertilizers are applied, the Japonica varieties give better results than those of Indica. With the exception of Japan, Korea and

[7] Rice-growing areas are generally coincident with malarial tracts. Mosquitoes and rice plants are both sub-aquatic—one aquatic fauna and the other aquatic flora. They grow under the same conditions of high temperature, high humidity and heavy rainfall. While malaria has been completely eradicated from such areas in America and Europe, the control of mosquitoes and the suppression of malaria from the rice-growing areas of Asia are yet to be brought about. Beri beri is a vitamin deficiency disease and is prevalent where people take white polished rice as a main item of diet.

Formosa, Indica varieties are grown in most of the Asian countries.

Rice may also be grouped into two general classes—"hill rice" and "swamp rice". 'Hill rice' requires much less water than 'swamp rice', being frequently grown without irrigation where rainfall is abundant. 'Swamp rice' requires frequent flooding, and must be raised on level ground suitable for irrigation. The yield of 'hill rice' per acre is normally less than one-half of that of 'swamp rice' and so it is much less cultivated. Hill rice and swamp rice are seeded in different manner. Hill rice is sown broadcast, while the swamp rice needs first a seed bed from where the plants are transplanted to fields as soon as the seedlings acquire certain size.

The upland or 'hill rice' is raised largely by the majority of peoples of the Malaya Peninsula and near-by islands, of tropical America and Equatorial Africa. The great monsoon regions of Southern and Eastern Asia are favourable to the raising of low land or 'swamp rice'.

RICE (PADDY): AREA AND PRODUCTION

Country	Area (1000 hectares) 1969	1970	Production (1000 metric tons) 1969	1970
India ...	37,680	—	60,645	—
Burma ...	4,678	—	7,985	8,128
Bangladesh ...	11,000	—	21,000	—
Indonesia ...	8,209	8,237	16,197	16,839
Thailand ...	7,300	—	13,410	13,660
Japan ...	3,274	2,923	18,186	16,479
Brazil ...	4,621	—	6,394	—
U. S. A. ..	861	734	4,120	3,758
Rep. of Vietnam	2,430	2,520	5,115	5,651
Egypt ...	504	480	2,557	2,605
China (Mainland)	32,759	—	95,000	—
WORLD ...	135,033	—	295,436	306,817

Over 80 p.c. of the world's rice is grown in Asia. This concentration of rice production results from adequate moisture supply, proper temperatures, suitable land forms, fertile soils

and a large supply of cheap labour in the south-east part of Asia with monsoon climates. The growing season varies from three to five months according to the distances of the areas from the equator. The rivers of South-East Asia have wide, level valleys in their lower courses, and many have broad delta plains to permit extensive cultivation of rice. At the southern limits of the South-East, two crops of rice in a year are possible. Rice is chiefly produced in India, China, Burma, Malaysia, Bangladesh, Vietnam, Indonesia, Thailand, Korea, Formosa, Japan and Philippines. India and China are the world's greatest producers of rice. The output is generally high in all the Asian monsoon areas including Japan, Indo-China, Indonesia, Thailand, Korea and Bangladesh. Japan, however, leads the world in respect of rice-growing methods and application of fertilizers. There is also some production in Egypt, Italy, Spain, U.S.A. and Brazil. Brazil has about 4 million hectares of land under rice cultivation with an annual yield of 7 million metric tons. The rice production in the U.S.A. is about 4 million metric tons a year. Owing to climatic limitations Europe raises only about 0.5 p.c. of the world production of rice. Warm, moist lowlands of the Mediterranean are suitable for the cultivation of rice, and even there irrigation is necessary. The share of Italy in the world's production of rice is insignificant; but she maintains a very high yield per acre. Rice in Italy is grown in the valleys of northern provinces of Piedmont, Lombardy, Venetia, Emilia and Tuscany. In 1970 Italy produced only 870 metric tons of rice. Spain, the other producer of rice in Europe, had 417,000 tons of rice production in 1970.

In recent years rice has become an important crop in U.S.S.R. where about 330,000 hectares of land are now under its cultivation in Azerbaizan, North Caucasus, Kazakh and the Far East. The average yield of rice per acre is about 12 bushels. The production was a little above 1 million metric tons of rice in 1970.

The yield of rice in areas of high latitudes is higher than that of tropical and equatorial regions. In higher latitudes rice flowers within 100 days compared to 150 days in other areas.

The average yield of rice per hectare in the world was 21 kg (100 kg/hectare) in 1967. The *Indica* variety in all countries

gave lesser yield than the average. The following figures show the comparative acreage yields in 100 kg/hectare of Japonica and Indica varieties : (1967)

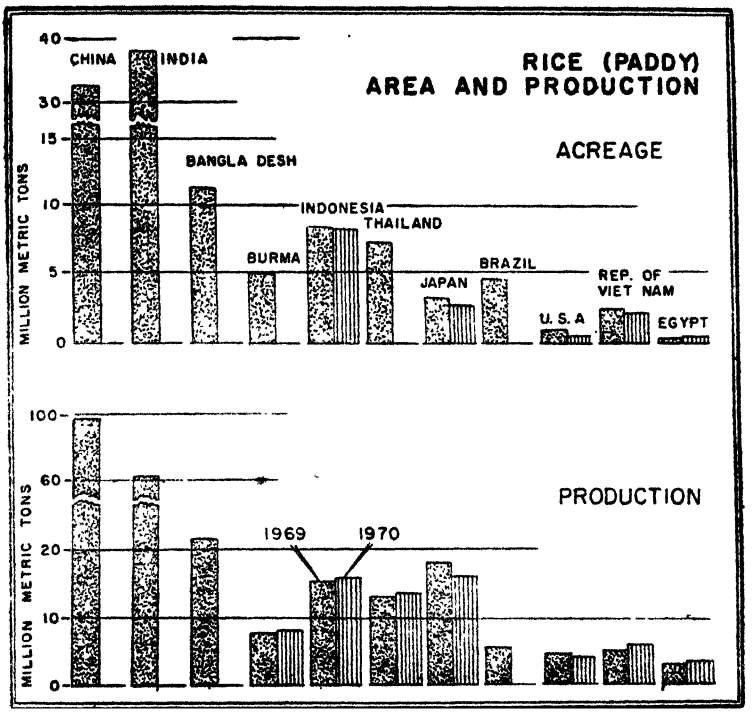


FIG. No. 15. Rice (Paddy): Area and Production.

JAPONICA			INDICA		
apan	...	57·5	Indonesia	...	18·5
.A.R.	...	49	Thailand	...	17·1
Korea	..	39	Burma	...	16
Ceylon	...	21	India	...	15·5
U.S.A.	...	51.6	Cambodia	...	12
			Philippines	...	13·8

Trade in Rice

The enormous home consumption of rice in India, China, Japan, Bangladesh, Indonesia and the Philippines prevents these countries from having an exportable surplus of rice. The

surplus to the world market comes from the less densely populated sections of Burma, Thailand and Vietnam.

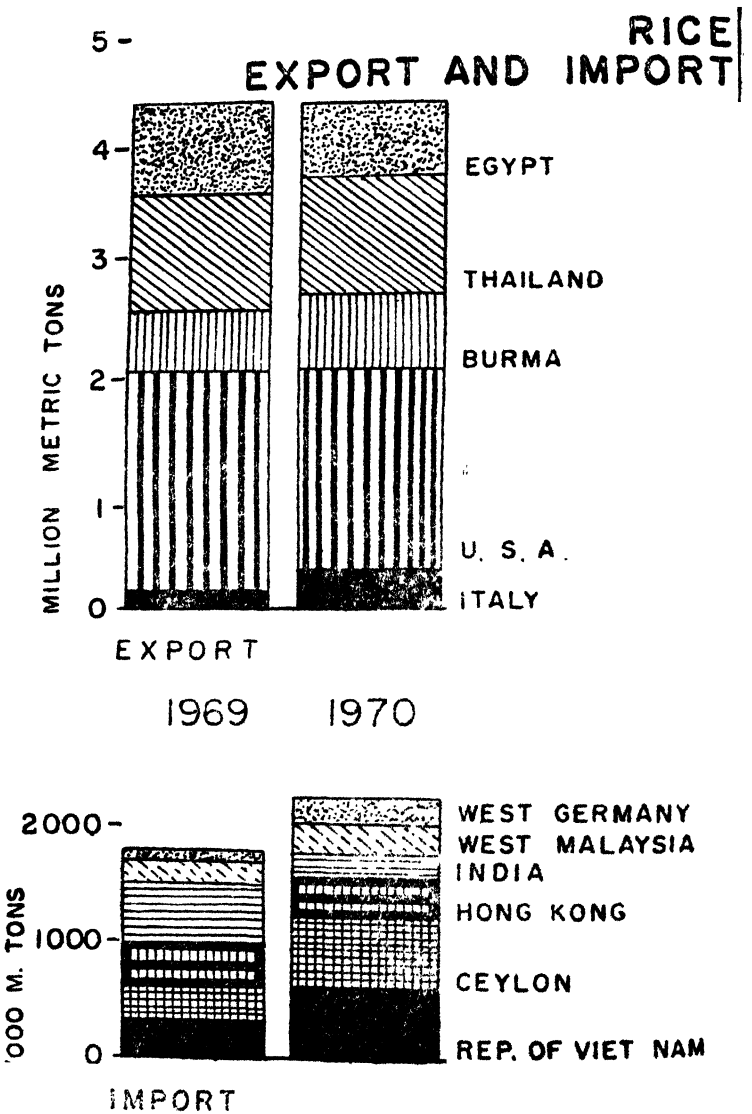


FIG. No. 16. Rice: Export and Import

Normally, 5 to 10 p.c. of the total production of rice moves into international commerce. Burma, Thailand and Cambodia handle the major portion of the trade. In 1967, about 8 million tons of rice were put in the international market.

The most striking change in recent years has been the role of U.S.A. as an exporter of rice. This is because India and a few other countries in Asia obtain rice from the U.S.A. under Public Law 480. Of late, the Arab Republic of Egypt has become an important exporter of rice. It may be mentioned that "before the communist victory on the mainland, China traditionally imported half a million to two million tons of foodgrains a year." The occasional export of rice is at present encouraged not because China has any surplus after meeting domestic requirements but because payments for imports of capital equipment has to be made.

EXPORT OF RICE

(In 1000 metric tons)

	1960	1966	1967	1970
U.S.A. ...	997	1352	1848	1743
Burma ...	1720	1100	544	640
Cambodia ...	319	165	222	171
Thailand ...	1220	1507	1486	1024
U.A.R. ...	308	346	434	655
World total ...	6945	5492	5380	—

The principal importers of rice are India, Japan, Malaya, Ceylon, France, Indonesia and Cuba, China also imports rice.[8] Indonesia and Bangladesh import rice despite good domestic crops because of internal distribution problems and increasing consumption. It is a curious situation that main importers of rice are also leading producers. To a large extent the strong demand for rice from these countries has kept rice trade busy. As Japan's position in food crops has improved, the decline in the import of rice is quite considerable. With the increase in their incomes, consumers have become more selective, and consumption of subsidiary foods has increased. In

[8] Plant diseases, occasional bad weather and frequent blunders of the communes have made the position of agriculture in China very poor.

Europe, the main importers are France and U.K. This market is being competed by U.S.A., Australia, Spain, Italy and Thailand. No other food product is subject to so many restrictions in regard to export or import as rice is. There are government monopolies, government to government trade agreements, barter agreements, etc.

IMPORTERS OF RICE

(In 1000 metric tons)

	1966	1969	1970
India ...	765	468	206
Japan ...	811	509	—
Ceylon ...	693	306	545
Hongkong ...	366	420	345
Singapore ...	261	256	272
West Germany ...	188	124	170
U.K. ...	112	107	126
World total ...	4,418	3,606	2,893

The Problems

The introduction of high yielding varieties of rice has brought about significant progress in a few countries in recent years. Technical, economic and institutional problems still stand in the way of such introduction of high yielding varieties in many developing countries. Since new varieties have a great economic advantage over the traditional varieties in many areas, their progressive adoption in more countries will have serious implication on countries which produce rice for export. There is already a trend towards decline in the import markets of rice, accompanied by an expansion of exportable supplies.

In fact, the trend towards self-sufficiency in rice has been going on in all the big Asian importing countries. Ceylon, the world's third biggest importer of rice, is pushing up home production at the rate of 100,000 tons a year by giving subsidy to rice growers. India, Philippines and Indonesia have cut out marginal imports because of lack of foreign exchange. All these have effects on Burma and Thailand—the two leading Asian exporters of rice.

There is need for a proper appraisal of supplies of and demand for rice in Asia to deal with the problem of distribution. The International Rice Conference set up in Asia consists of rice producing and consuming countries of the world to deal with problems concerning rice. The organisation has undertaken the work of control of prices and stocks and the task of international distribution.

Maize :—Maize is a native crop of South America and is one of the most valuable food plants of the world. It is largely employed in distilleries and in the manufacture of starch and glucose. Its peculiarly high fattening properties and its prolific yield have caused its large employment in the rearing and fattening of livestock. It is not normally important for human consumption, except in producing areas having a relatively low standard of living or in times of famine. Various kinds of food for human consumption—maizena and cornflour—are also made from maize.

Before the discovery of the New World, maize was not known either in Europe or Asia. In Europe maize is known *Indian corn,* because the term *corn* generally refers to all grains as in England or rye as in Sweden. In America, however, corn means maize.

Both in area and in production, the importance of maize is on the increase. From 138 million tons in 1948-52, the production increased to 264 million tons in 1967. In spite of regional fluctuations, the world production has been maintaining a steady increase.

MAIZE: AREA AND PRODUCTION

Country	Area (1000 hectares)		Production (1000 metric tons)	
	1968	1970	1968	1970
U.S.A. ...	22,614	23,212	111,560	104,393
Brazil ...	9,584	—	12,814	—
Mexico ...	7,675	—	8,978	—
Rumania ...	3,344	—	7,105	7,700
India ...	5,716	—	5,701	5,674
South Africa ...	5,480	—	5,316	—
WORLD ...	104,884	—	251,351	266,790

Maize requires a higher temperature and much more summer rain than wheat. The warm and humid portions of the world are ideal for maize cultivation. Its poleward limits are determined by temperature conditions which should be at least 70°F during summer months. The soil should be rich and well drained. Very little maize is grown in areas having a rainfall of less than 8 inches and most of the maize is grown in regions with an annual rainfall of 20 inches. The yield of maize per acre varies considerably from region to region. On the basis of 100 kg/hectare, India raises 11 compared to 53 in Canada, 49 in U.S.A., and 32 in Chile. The average yield per hectare is the highest in North America with 49 per 100 kg/hectare and lowest in the Far East with 11.

U.S.A. raises more than 50 p.c. of the corn produced in the world. The 'corn' belt of U.S.A. lies from Central Ohio to Central Nebraska and covers about 10 p.c. of the land area of the country. 'Corn' is grown in Pennsylvania, Kentucky and Connecticut. The corn belt proper, however, supplies about half the total corn of U.S.A. American corn belt is favoured by level lands, fertile soil, hot season, and adequate rainfall

It is interesting to note that the production of maize in U.S.A. increased by 100 p.c. from what it was in 1930 and the actual area under maize is now 60 p.c. of what it was in 1930. All this has been possible because of the application of science to maize cultivation.

Both in production and export, the U.S.A. is easily the leading country in the world. The entire meat-packing industry of the country is concentrated in the corn belt with Chicago, St. Louis, Indianapolis and Cincinnati as the chief centres. Yields in the United States are increasing because of the introduction of high yielding hybrid corn. Almost the whole of the large production of maize in the United States is consumed domestically and the bulk is fed to animals. The remainder is used in the manufacture of various food and industrial products while some is retained for farm household use. Brazil is the second largest producer with only about 8 million tons, but it does export ; and in Mexico, it is grown on small subsistence-type farms. Another producer of maize is Argentina. The valley of the Parana river is the corn belt of Argentina which is in the region of the Pampas. Corn in

Argentina is cultivated in association with flax. Occasional drought years and occasional locust years are problems of Argentina. The crop is raised as a cash crop for the sale and export to Europe. 60 to 70 p.c. of Argentina's production of maize is exported.

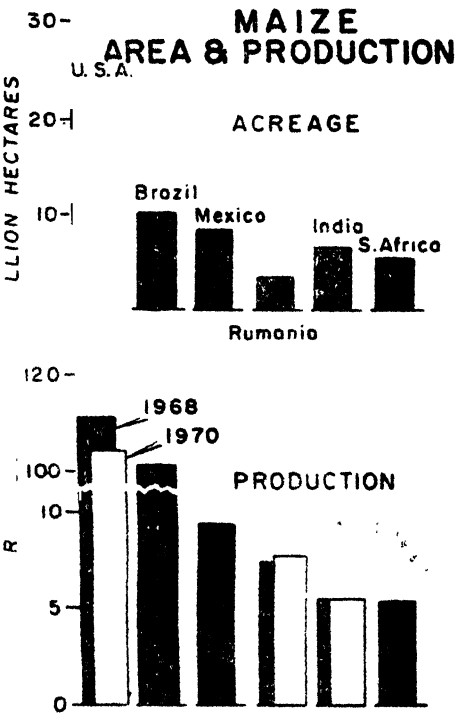


FIG. No. 17. Maize Area and Production.

In Europe, corn is a major crop in the Po river plain of Italy, the Danube lowlands and the Ukraine of U.S.S.R. The Danube lowland is the world's third largest corn raising region. In South Africa, the production of maize is an industry of very great importance and there has been a rapid rise in output during the past forty years. Corn in the Union of South Africa is known as *mealies* and is mostly grown in the northern portion of Orange Free State and the southern part of Transvaal. Practically, all corn exports of South Africa are

taken by U.K. In India the production of maize for food is quite considerable.

Frequently the area planted with maize bears little relation to the area harvested for grain since the plant may be used green for food and ensilage, and in some countries it is cultivated solely for this purpose.

As maize is cultivated mainly for consumption in the domestic areas, its volume of export is only one-third of wheat notwithstanding the fact that maize production is larger. The chief exporting countries are the U.S.A., Argentina, Rumania, Yugoslavia and South Africa. The livestock feeding areas of Europe like U.K., Netherlands, France and Denmark import maize.

FOREIGN TRADE IN MAIZE

(1000 metric tons)

Exporters	1969	1970	Importer	1969	1970
U.S.A.	13,961	14,402	Italy	4,317	4,21
Argentina	4,024	—	U.K.	3,156	3,11
France	2,171	2,455	Spain	2,344	1,97
Brazil	659	1,471	West Germany	1,834	2,60
Thailand	1,476	—	Belgium	1,141	1,36
			Netherlands	1,965	2,467
Grand Total	25,022	—		16,592	—

Millet :— It is a small-seeded cereal grain of the Monsoon tropics where it is too dry for maize and rice or too hot for wheat. It is grown for fodder or for food.

Millet flourishes best in those hot lands where rainfall is scanty and unreliable. It can be grown without irrigation even in areas which are fairly dry. The important millet-producing countries are India, U.S.S.R., China, and the Sudan. Everywhere in China north of latitude 33°N millet is an important crop and occupies about 15 p.c. of the cultivated area. In India, millets are the chief crops in the Monsoon Tropical Deccan plateau. There is very little trade in millet, nearly all of it being grown for local consumption. The world production of millets including Sorghum was about 90 million metric tons in 1969 of which India produced 9 million metric tons.

Distribution of World's Beverages

Tea :— It is the name given to the dried leaves of an Asiatic shrub. Though its use has been known to Asia for thousands of years, tea was first introduced in Europe in the middle of the seventeenth century. Tea has become so universal in use as beverage among the civilised peoples that it is now looked upon more or less as a necessity.[9] The greatest tea-drinkers are the Chinese, British, Russians, Dutch, Australians and South Americans. Tea is of great importance as a currency earner in many developing nations. Tea is tenth in value of all products that enter world trade, and accounts for the export earnings of Ceylon (60 to 65 p.c.), India (20 to 22 p.c.) and Kenya (10 p.c.).

Tea shrub belongs to the wetter portions of the Monsoon tropics and the higher elevation of the Rainy tropics. Tea requires a deep fertile soil, which must be exceptionally well drained, so that there can never be stagnant water in the soil. It is, therefore, generally grown on hill-sides, although it flourishes in well-drained valleys also. High temperature is absolutely necessary in summer.

An economic factor that restricts tea-growing is the need for a large supply of cheap labour. All the picking of the leaves is done by hand and it involves a great deal of manual work. It is, therefore, grown in those sub-tropical lands which have abundant cheap labour.

The important tea-producing countries are India, Ceylon, Indonesia, Japan, Bangladesh and China. Some tea is grown in Kenya, Uganda, Tanzania and Nyasaland. Tea is also produced in the Transcaucasian region of U.S.S.R. There is also a limited production of tea in the rainy coast of Iran along the southern shores of the Caspian Sea. The production trends continent-wise during the last ten years have shown that Africa with a production of 20,000 metric tons in 1948-52 has increased it to 115,000 metric tons in 1969 and that in South America the production during the same period has gone up to 21,000 metric

[9] Although tea ranks next to coffee in respect of commerce, the number of tea drinkers is far ahead of that of coffee. This is because the tea growing areas are also densely populated and their inhabitants consume tea.

TEA: AREA AND PRODUCTION

Country	Area (1000 hectares) 1968	1969	Production (1000 metric tons) 1968	1969
India ...	351	350	403	395
Ceylon ...	242	241	225	220
China (Main) ...	190	190	159	159
Japan ...	49	50	85	90
Indonesia ...	58	57	41	40
Bangladesh ...	42	45	28	30
Ufianda ...	15	16	15	18
World Total ...	—	—	1242	1267

tons from 1,000 metric tons. In Africa, the principal tea producing countries are Kenya, Malawi, Uganda and Mauritius. In South America, 80 p.c. of the production comes from Argentina. These developments in Africa and South America have altered the relative importance of South-East Asia as a producer of tea. In 1970, South-East Asia produced 80 p.c. of the world's total tea compared to 96 p.c. in 1948-52.

Area under tea cultivation over a period of last ten years has not increased appreciably in any country of Asia. Improvements in agricultural techniques have, however, helped to increase the yield.

China is a large producer of tea, but there is hardly any exportable surplus on account of heavy demand in the domestic market. From the northern border of the Yangtze Valley to Si-Kiang, tea is extensively cultivated. Occasionally, China exports tea, and the quantity is as large as 20,000 tons. In Europe, the first tea came from China, and for many years China was the main supplier of world's tea. Later on, she lost markets to India and Ceylon. The Chinese tea is *green*, as against black from India. Green tea is prepared from plucked leaves which are withered, rolled and fired immediately. Black tea is fermented before firing. More than 60 p.c. of the tea growing areas in China is in the South Yangtze highland region.

World Trade in Tea

The chief tea-exporting countries are India, Bangladesh, Kenya, Ceylon and Indonesia. India is the leading tea-ex-

porting country in the world, handling as she does about 35 per cent of the world's tea trade. The production of tea in India is concentrated in the hill region of Southern India and the north-eastern highland region. India now absorbs approximately one-third of her total output. After 1948, domestic consumption of tea has increased by about 40 p.c. in India. As the average level of income is still low in India, changes in the price of tea or in income have a significant effect on the level of tea consumption in non-coffee drinking areas. In coffee

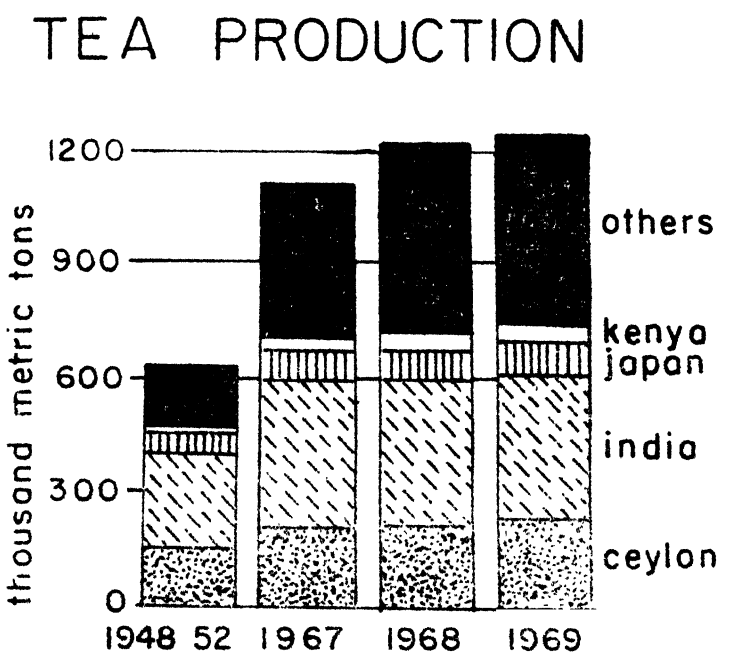


FIG. No. 18. Tea Production

drinking areas, however, tea consumption does not increase with increase in income.

The volume of tea exports from India is very much disturbed by the floods of the north-eastern part of Asia because of the dislocation of railway lines. About 8 p.c. of the world's tea is produced in Africa but it exports about 15 p.c. of the world total. The principal areas are Kenya, Uganda and

Tanzania. Africa is fast becoming a competitor of India in European markets because of the improvements in the quality of her tea as well as low costs. Indonesia ranks third or fourth in tea production which was started by the Dutch. The main area is Java where it is planted in the western volcanic highlands. In quality, Indonesian tea is considered inferior to that of India and Ceylon.

The principal tea-importing countries are U.K., U.S.A., Australia, Canada, U.A.R., Iraq and U.S.S.R.

TRADE IN TEA

(In 1000 metric tons)

Exporters	1968	1969	Importers	1968	1969
Ceylon ...	209	202	U.K. ...	270	212
India ...	208	169	U.S.A. ...	70	64
Kenya ...	33	37	Netherlands ...	32	29
Uganda ...	11	16	Canada ...	23	22
World ...	539	509	Iraq ...	25	23
Asia's share	439	397	Australia ...	30	28
			South Africa ...	19	20
			Grand Total ...	599	521
			Europe's share	329	262

In fact the prosperity of the tea industry depends to a very large extent on the demand from U.K. which is the largest consumer in the world and accounts for 35 p.c. of the world's total. The preference for tea has spread from U.K. to the other countries of the Commonwealth which today consumes about 60 p.c of the world total. Of her total imports of tea, U.K. re-exports about 10 p.c. to the Commonwealth countries. The imports of tea in the U.S.A. has increased considerably in recent times, but the share of Indian tea is on the decrease. The greatest competitor of Indian tea in the U.S.A. is Ceylon whose share in the total U.S.A. tea import is about two-fifths of India's share, in terms of weight. The scope for increasing exports of tea to the U.S.A. is considerable, particularly in view of the fact that *per capita* annual consumption in that country at present amounts to 0·7 lb. only compared to 9·9 lbs. in U.K., 7·7 lbs. in Netherlands and 8·6 lbs. in Australia.

China is gradually emerging as a potential big competitor to India in the world tea market.

So long India had to face competition from Ceylon and East Africa (Kenya). But now China is trying to wrest some traditional markets from India and other tea growing countries. It has already made inroads into some of the Middle Eastern countries and the UAR.

Some Trends in Tea Consumption

An organisation, called the Tea Council of U.S.A., has been set up with members from Ceylon, India, Indonesia and the U.S. Tea Associations. The International Tea Committee is carrying on work in a variety of directions towards securing a substantial increase in tea consumption both in the U.S.A. and in Canada. Over a million dollars are being spent in the United States of America annually towards tea propaganda, which is increasing the consumption of tea in that country. In January 1969, the producing countries at a consultation in Kampala (Uganda) recognised that the expansion programmes and plans for increasing productivity would depress prices unless urgent actions are taken to increase demand on the basis of international co-operation.

There has been an upward trend in the internal consumption of tea in the producing countries.

Changes in the demand for tea in any country is due to a combination of factors like (*a*) the size of its population (*b*) the composition of population by age, race, town or country dwellers (*c*) the level and distribution of income (*d*) the prices of possible substitutes. It is interesting to note that while the per capita consumption of tea is higher in high-income countries, the demand for tea has not increased over many years. The poorer countries, however, have shown increase both in demand and per capita consumption.

U.K., Australia and New Zealand are predominantly tea-drinking countries, while U.S.A. and Western European countries prefer coffee. Both the U.S.A. and Canada can increase their demand for tea substantially, if the right type of propaganda for tea is conducted in those countries. Canada is a large consumer of tea where about 60 p.c. of the families are

tea-drinkers. The recent trend of consumption is however on the decrease as the younger generations prefer coffee. Tea in America is, however, a highly competitive beverage: it has its rivals in coffee and cocoa. U.S.A. consumes about 125 million pounds of tea a year. Coffee, however, greatly outranks it, the quantity consumed being 2,596 million pounds annually. Since the days of the Boston Tea Party in 1773 when Americans boycotted tea because Britain required payment of a tax, coffee has been the favourite American beverage. The *per capita* consumption of tea in the U.S.A. is very small, no doubt, but it is capable of a substantial improvement, notwithstanding the existence of other competitive beverages.[10]

Cocoa[11]

The cocoa tree is indigenous to the hot, humid forests of the Amazon and Orinoco basins of South America and lowlands of Central America and Mexico. It has been transplanted to other parts of the wet equatorial region and has become a profitable plantation crop on account of its nutritive value. Chocolate is the product of cocoa.

Conditions of Growth

Cocoa trees require constantly high temperature and an abundance of moisture. "Much moisture and deep fertile soil are essential to a good yield." A prolonged and excessive drought is very harmful and too much rain is also a disadvantage. The plant requires shade from sun and shelter from winds coming from the seas. It is customary to grow cocoa trees under the shelter of banana, mango or rubber trees. A cocoa tree can grow to about 30 feet high, but to protect it from the sun, the tree is often pruned. A cocoa tree attains its full vigour and productiveness in three to seven years following

[10] Tea is still by far the cheapest beverage and not an inconsiderable number of Americans are already strongly tea-minded. Iced tea appears to be more popular than hot tea, and propaganda is conducted both in favour of iced tea and hot tea. Another practice in U.S.A. market is the preference for tiny "tea bags". Today in U.S.A., "tea bags" account for 50 p.c. of the total tea sold in the American markets. Another latest practice is the use of "instant tea", which is, in fact, the water-soluble tea powder.

[11] Cocoa is an English corruption of the Spanish word cacao.

planting, after which production increases for ten to fifteen years and does not decline until after 30 to 40 years. Once trees are planted, the trend of production can be determined for considerable period of time.

Geographical Distribution

Regions of equatorial climate are best suited to cocoa plantation. Ghana, Nigeria, Togo, Cameroon, Ivory Coast and Brazil are the chief producers. Small quantities are also grown in Ecuador, Spanish Guiana and Ceylon. Thus the distribution of cocoa is limited to within 20 degrees of the equator. Cocoa beans are contained in a pod which looks somewhat like a cucumber in shape. The pods are generally six to eight inches long. The beans are removed from the pods and are then subjected to fermentation in certain vessels or buried for a while in the earth. The latter method is said to produce the best cocoa. The beans are then roasted and shipped to different nations for manufacture into chocolate, cocoa butter etc. Cocoa butter is the principal byproduct of the chocolate industry.

Production of cocoa beans is subject to wide annual variations by as much as 12 per cent either on the higher or lower side. The remarkable increase of production in the African countries is due to the fact that in 1950 many cocoa trees were planted which are now giving rich yields.

PRODUCTION OF COCOA

('000 metric tons)

	1954	1960	1965	1968	1969
Brazil ...	169	178	144	194	211
Ghana ...	244	254	428	421	480
Nigeria ...	90	157	220	235	260
Cameroons ...	58	69	85	87	90
World Total ...	830	1,200	1,250	1,339	1,422

It has been estimated that the world production of cocoa in 1971-72 was 1·6 million tons as against the requirements for 1·5 million tons.

Because of the absence of the appropriate type of climate, Asia is hardly interested in cocoa production. Philippines, Ceylon and Indonesia are the only countries which, between themselves, produce only 7000 metric tons of cocoa beans a year. New Guinea, Papua and New Hebrides in Australasia have the requisite climatic conditions, but the paucity of labour has been responsible for low production of 20,000 tons a year.

Ghana provides about 40 per cent of the world's supply. Ghana's domination in cocoa production is due to a number of factors. Apart from the facts that climate and soil are favourable, the planters exploit the land with great skill and have concentrated only in the production of cocoa. "Other factors are that Ghana lies on an old established shipping route, and that the development of railways and roads has made communication between the plantations and the ports very much superior to those existing in the older producing countries such as Ecuador."

Brazil ranks third in the production of cocoa, and its cultivation dates back to 1740 in Para. Cocoa is extensively grown in the *cacao coast of Bahia,* which produces 90 p.c. of Brazil's coffee. The soil and climatic conditions of Central America and Ecuador in South America are ideal for cocoa plantations. In fact, Ecuador dominated the world trade in cocoa till 1913. Thereafter, tropical diseases and unhealthy climate in the cocoa plantation areas of Ecuador accounted for its neglect. In 1969, Ecuador raised only 60,000 metric tons of cocoa beans.

World Trade in Cocoa

In most of the cocoa-producing countries, it is cultivated for foreign markets. Exports of cocoa constitute about 90 p.c. of the total production in each of the following countries: Ghana, Brazil, Nigeria and Dominican Republic.

At present the U.S.A. leads the world's consumers of cocoa. Forty per cent of the world's annual crops goes to the U.S.A., followed by W. Germany (8 p.c.), and Netherlands (6 p.c.) and others. Spain is the only European country where

cocoa is regarded as a necessity. Switzerland and Netherlands import large quantities for making chocolate.[12]

One uncertain factor about world trade in cocoa is its violent fluctuation in prices. Often, a portion of stock is held back in most exporting countries to stabilize prices, and to put the same in the next year. The immediate problem is to maintain a price which may be acceptable as remunerative to producers and reasonable to importers. In view of the prevalence of speculative transactions in cocoa markets, the price fluctuations have little relation to actual crop expectations. In 1966, a United Nations Cocoa Conference was convened to consider establishing an International cocoa agreement.

Although the trend of consumption is upward, the recent planting rates are sure to disturb the balance between production and consumption in a few years' time, bringing repercussions in prices. There is, therefore, urgent need for the expansion of consumption in Eastern Europe and Asia as well as in developed countries. The members of the *Cocoa Producers' Alliance* (Brazil, Cameroons, Ghana, Ivory Coast, Nigeria and Togo) which account for 80 p.c. of the world production initiated in 1963 an arrangement to regulate the markets.

Coffee.

It is grown in many countries and has become a regular commodity of consumption in several parts of the world.[13] Coffee is an important primary commodity entering international trade, after petroleum.

[12] The Soviet Union may change the pattern of world trade in cocoa as it has started buying cocoa from most of the producing countries. Russia with its huge population and a suitable climate for the consumption of chocolate is likely to become the world's greatest potential consumer of cocoa.

[13] Coffee is native to Arabia where, centuries ago, it was used as medicine, then as food and later on boiled to produce a beverage. It is said that in order to keep the cultivation of coffee confined to their country, the Arabs roasted coffee beans before exporting them outside and killed the power of germination. However, by seventeenth century, coffee had already become a popular beverage in Europe. Coffee began to replace tea in America after 1773. Today, the world's market for coffee is in Middle Latitudes, with U.S.A. and Western Europe dominating world trade.

Conditions of Growth

Coffee is grown at altitudes up to 6,000 feet, but most of it is grown from sea level to 1,500 feet. Coffee plant requires a rich drained soil, a warm climate and a moderate supply of moisture; so plantations are generally limited to the tropics. Although a tropical plant, it does not require a high temperature. Above 86°F the yield suffers, while it cannot stand for long a temperature below it. The plant, when young, must be sheltered from strong sunshine and with this end in view banana and other shady trees are planted on coffee estates. As the soil must be rich and well-drained, the plant grows usually on hills and highlands where the streams have rapid falls to give the necessary drainage. Rainfall is of fundamental importance to coffee plants. In the Equatorial Regions it usually rains throughout the year but towards the Tropics dry seasons are experienced whose duration varies according to altitudes. The minimum rainfall required by the coffee plants from germination of the seeds up to the ripening of the cherries is from 50 to 60 inches. When it does not attain this minimum, it can be supplemented by irrigation. If there is too much rain, drainage is necessary. Three to five years are required for the plant to mature after which it bears fruit for some thirty years. The pulp of the fruit is removed to obtain cherry-stones inside. The inner kernels of these cherry-stones yield coffee.

One economic factor on which large output depends in most lands is the supply of abundant cheap labour, because a large amount of hand-work has to be performed in preparing the product for the market.

For many reasons coffee yields vary from country to country. The chief factors are (*a*) quality of the soil, (*b*) climatic conditions, (*c*) species, varieties and age of the coffee plant, (*d*) cultivation methods, from selection of seed to pruning and harvesting and (*e*) method of commercial preparation. Coffee is very often subject to several troublesome diseases. The plantation in Sao Paulo region of Brazil loses often 30 p.c. of its coffee crop because of disease. Indonesia lost her leadership in the export of coffee because of the ravages of diseases. The yield per hectare is also a matter of the methods that are

used in the commercial preparation of the product. The yield per hectare is fairly high in Colombia, Venezuela, Salvador, Guatemala, Cuba and Kenya. The yield corresponds to world average in Brazil, Mexico, Angola and Dominican Republic. The examples of poor yield are in India, Puerto Rico, Congo and Madagascar.

Geographical Distribution

Coffee is grown in some thirty different countries. The important coffee-producing countries are Brazil, Central America, Venezuela, Colombia, Andean Highlands, India (South), Ceylon, Indonesia and Arabia. There are three main varieties of coffee—milds, Brazils and robustas. Latin America, East Africa and India grow mild coffee which is known for its mild flavour. Robusta coffee comes from Africa and Indonesia.

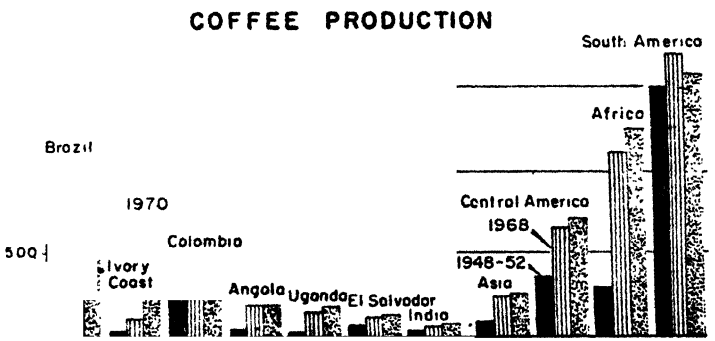


Fig. 19. Coffee Production.

Recently, Africa has emerged as an important supplier to most European markets, and, to some extent, also to the United States. Angola, Ivory Coast and Uganda are the main producers of coffee in Africa. Production in moderate quantities is also found in Cameroon, Congo (Leopoldville), Ethiopia, Madagascar, Kenya, and Tanzania. African output increased in the past seven years by more than 70 p.c., and its share in the world production now amounts to about 18 p.c. Nearly 80 p.c. of African coffee is of the Robusta variety. With negligible domestic consumption, practically all coffee pro-

duced is channelled into export trade, and now accounts for more than 20 p.c. of world export.

COFFEE PRODUCTION

(In 1000 metric tons)

Country		1948-52	1968	1970
Ivory Coast	...	50	205	246
Brazil	...	1,077	1,056	862
Colombia	...	352	480	492
Angola	...	50	198	198
Uganda	...	35	147	174
El Salvador	...	75	114	120
India	...	20	58	63
World Total	...	2,222	3,789	3,828
Regional				
South America	...	1,502	1,716	1,580
Africa	...	278	1157	1,263
Central America	...	365	647	691
Asia	...	74	249	263

It will be noticed that while during the last twenty yea the production has remained almost constant in South Americ it has increased considerably in Africa. With a little above p.c. of the world's total in 1948-52, Africa now raises nearly p.c. of the world's total. With 50 p.c. of the world's produ tion in 1948-52, Brazil now raises about 25 p.c. of it.

Arabia is the home of Moka coffee, celebrated throughou the world for its excellent aroma and taste. Coffee was fir introduced in Arabia towards the end of the seventeenth ce tury from Ethiopia. As the climate of Arabia is extremely h and dry, the coffee crops are localised in Yemen. Yemen i on the whole, mountainous, and the climate is temperate i the interior. Coffee is cultivated in the mountainous zones Yemen at heights between 2,000 and 6,500 feet. The onl species cultivated is *coffee arabica* which is called Mok Though the soil and climatic conditions are excellent ther inadequate irrigation, poor roads, high taxes and bad gover ment have kept the yield per acre low. The annual productio has remained at about 3,000 metric tons a year since 195 Consequently the export is also small.

Brazil grows about one-fourth of the world's coffee and the prosperity of the country depends on the coffee trade. The coffee *fazendas* are the large plantations of Brazil located on the tropical upland of the southern portion of the country. The state of Sao Paulo, with its rich volcanic soils, is particularly suited to coffee-growing. The other areas are Rio de Janeiro, Espirito, and Minas Geraes. Sao Paulo is the main coffee-producing centre not only in Brazil but also in the whole world. The crop was first introduced in 1800, though the real progress started from the second half of the nineteenth century. The *great interior plateau* of the Sao Paulo state is the most extensive and the best adapted to the cultivation of coffee. The soils of south-eastern Brazil are the red earths and help the growth of fine flavoured coffee. On many large plantations (Fazendas) the labour force consists of Italian immigrants, Polish and Japanese workers. The danger of depending on one crop for the economic welfare of the people of a country is best seen from the Brazilian coffee industry. In 1897 there was a great over-production of coffee in Brazil and in consequence the prices fell heavily, bringing miseries in its wake to innumerable Brazilian coffee-growers. In its effort to restore prices the Brazilian Government resorted to valorization, which consisted in buying up large stocks of coffee, holding them until the prices improved and then releasing them gradually. Since then valorization measures have become a regular part of the Brazilian coffee-marketing programme.

In India the principal coffee regions are Mysore, Madras, Kerala and Bombay. The Nilgiris, Annamalai and Cardamon Hills together constitute the most important coffee-producing regions of India. In some of the growing areas coffee has been replaced by tea. In 1971 the production of coffee in India was about 70,000 tons. Indian coffee is exported to the United Kingdom and France.

World Trade in Coffee

Although coffee is not a major crop of the world either in terms of value or quantity, it has a special position in the world economy inasmuch as the proportion of world coffee production entering international trade is higher than most of

the other agricultural commodities. Exports of coffee make a substantial contribution to the export earnings of many developing countries. Of the total world production of coffee, about 70 p.c. are exported. Brazil handles 50 p.c., followed by Colombia (20 p.c.) and Africa (20 p.c.) Coffee ranks first in value among the exports of many Latin American countries, and it is the principal commodity imported into the United States. In 1969 coffee exports accounted for about half of the value of total exports from Brazil (44 per cent), Colombia (62 per cent), Costa Rica (41 per cent), El Salvador (50 per cent), Guatemala (46 per cent), Haiti (58 per cent) and Nicaragua (18 per cent). It is the most valuable single product exported from several others (Angola, 34 per cent; Ecuador, 20 per cent; Uganda, 48 per cent.). All these countries depend very much on export of coffee for their prosperity. In 1969, total exports of coffee from the different countries of the world amounted to 3.06 million metric tons, of which Brazil's share was 1.1 million tons.

The principal coffee-importing countries are the U.S.A., France, Sweden, Belgium, Italy, U.K., Canada and Sweden. The U.S.A. imports about 50 per cent of the world's coffee, followed by Germany (9 per cent) and France (8 per cent).[14] The highest per capita consumption of coffee is in Sweden with 24 lbs. followed by Denmark and U.S.A. with 21 and 17 lbs. respectively.

EXTERNAL TRADE IN COFFEE

(In 1000 metric tons)

Exporters	1968	1970	Importers	1968	1970
Brazil ...	1,108	963	France ...	246	240
Ivory Coast .	214	195	U. K. ...	92	92
Uganda ...	152	191	U. S. A. ...	1,614	1,189
Angola ...	189	181	West Germany	301	309
Colombia ...	396	391	WORLD ...	3,166	2,211
El Salvador ...	117	111	North America	1,614	1,267
WORLD TOTAL	3,153	3,011	Europe ...	1,392	1,511
South America	1,615	1,469			
Africa ...	921	938			

[14] The historical reason for the popularity of coffee in the U.S.A. was the fact that excessive taxation on tea imposed by the British on her North American possessions led to U.S. Declaration of Independence, and the new Republic immediately turned to coffee.

The International Coffee Agreement in 1963 aimed at stabilizing prices through export quotas and taking measures to increase consumption and control production. Considering the large increase in production in 1966, the operation of the Agreement was found to be satisfactory inasmuch as the prices

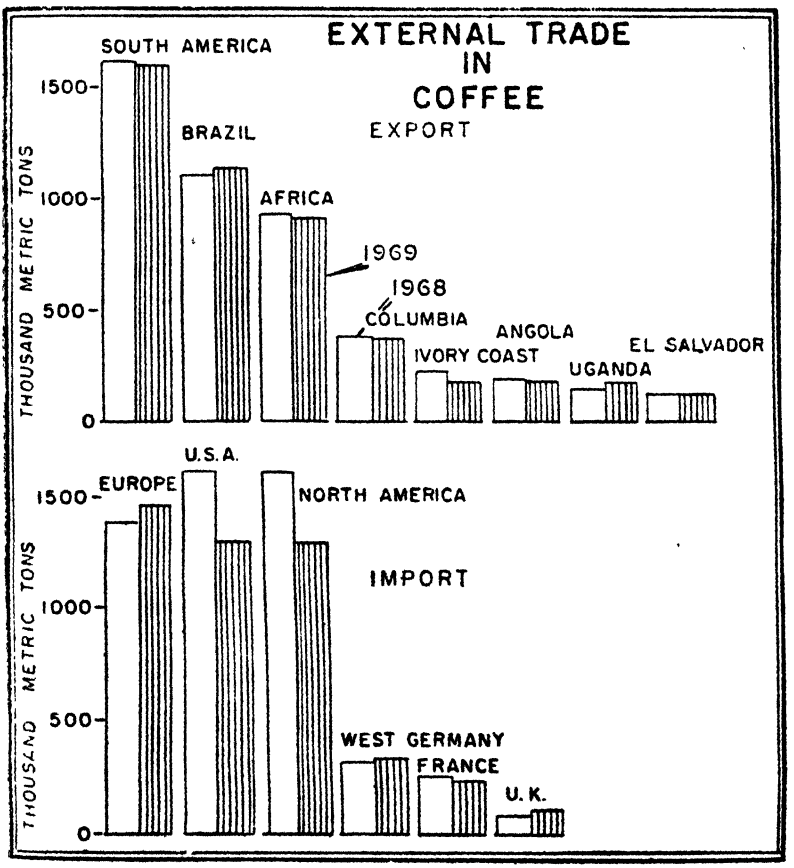


FIG. No. 20. External Trade in Coffee.

of coffee were kept under control. The 1968 International Coffee Agreement which will expire in September 1973 will be in a position to handle world coffee situation if conditions in Brazil are favourable. The main cause for concern is the long-term outlook of coffee. The consumption must increase and the consuming countries should remove import tariffs on coffee

if the chronic imbalance between production and consumption is to be redressed.

Problems in Coffee Trade

The expansion of coffee consumption is being hindered by two main factors:

(*a*) Lower standard of living and less purchasing power among millions of consumers in developing countries;

(*b*) the restrictive policy of import quotas, customs and domestic taxes in advanced countries which hit severely the importation, distribution and consumption of coffee.

In order to reconcile the interests of consumers and producers of coffee, International Coffee Council meets frequently to fix prices and export quotas. For many years, fluctuations in prices of coffee have dominated the world trade of coffee. Whenever prices have risen, more trees have been planted and although there has been a continued expansion in demand this has been outstripped by production and so prices have fallen. The problem of the coffee industry is therefore to control over-production and at the same time to keep price reasonably high so that the producers which are mostly underdeveloped countries can keep their economies in balance.

Another problem is the basis of quota itself. The rigid control of the producers in the International Coffee Council is not always without strong feelings by some in respect of the allotment of export quotas. Brazil has roughly a third of the total world quota, and some producers want that Brazil should relinquish a part of it in favour of African producers. The serious drawback of the quota adjustments is the total absence of emphasis on the types of coffee grown. Many producers are now building the Agreement on the basis of types of coffee grown.

Tobacco

Tobacco originated in America, but its use has now extended to all parts of the world. Its contents of nicotine and related alkaloids have narcotic effect to form habits in use. There are more than 50 varieties of tobacco plants, but of these

Tabacum and *N. Rustica* are of economic importance, from whose dried leaves tobacco is prepared. Tobacco plant can be grown under a wide range of soil and climatic conditions. It is raised in the equatorial region and also as far as Canada, Scotland and Northern Poland. In general, tobacco prefers a warm and fairly humid climate though it can be grown in regions of cool summer, and when irrigated, in areas of warm desert climate.

Conditions of Growth

Tobacco plant thrives in light soil that is rich in lime, humus and potash. Soil should have good physical structure nd should be deep and well-drained, as the plant has a large root system. As regards economic factors, a considerable amount of cheap labour is necessary for the cultivation and preparation of tobacco.

Geographical Distribution

Although tobacco is grown in many countries of the world, out 20 per cent of the total production is contributed by the ar East. North America stands next to Asia with about 18 r cent. Europe has about half the production of North merica. Latin America is very close to Europe in the production of tobacco. The leading producers of tobacco are the .S.A., India, China, Russia and Japan. Philippines, Indonesia, Brazil, Pakistan and most of the countries of Central d Western Europe also account for large quantities. Between 52 and 1968, the production of tobacco has increased by bout 60 p.c. on account of increasing demand for cigarettes.

TOBACCO: AREA AND PRODUCTION

	Area ('000 hactares)		Production ('000 metric tons)		
	1948-52	1968	1948-52	1968	1969
Bulgaria	74	114	45	114	96
Greece	84	111	49	88	78
Italy	56	52	76	72	79
U.S.S.R.	213	166	157	245	259
U.S.A.	674	358	958	777	820
Brazil	149	261	113	242	258
ndia	331	398	247	344	347
World Total	2,840	4,148	2,830	4,720	4,712

The U.S.A. is the greatest producer of tobacco. In 196! the U.S.A. raised about 18 per cent of the world's total com pared to 33 p.c. in 1948-52. The chief tobacco-growing State are North Carolina, Kentucky, Virginia, Tennessee, Soutl Carolina and Georgia which supply about 90 per cent of th output. The principal tobacco belt extends from Southern Maryland into South Carolina and includes the middle part o Virgina and North Carolina. The other States are Pennsyl vania, Wisconsin and Ohio. North Carolina produces mor than 40 p.c. of the country's crop, and Kentucky about 20 p.c Virginia, Tennessee and South Carolina together supply abou 20 p.c. The important tobacco centres are Louisville, Rich mond, Petersberg and Winston Salem. The U.S.A. import oriental tobacco and cigar leaf. The consumption of unmanu factured tobacco in the U.S.A. owing to raw material saving innovations in manufacturing techniques and changes in taste in favour of products which require less tobacco per unit (filter tip cigarettes) is on the increase.

Europe is a large producer of tobacco and equals Latin America in production. The leading countries are Bulgaria, Greece and Yugoslavia.

Although adequate data are not available, the estimates are that China raises about 10 per cent of the world produc tion. It is extensively cultivated in the central and north eastern regions of China. Very little quantity of Chinese tobacco is exported outside as the home consumption is enormous. Despite annual production of only about 50,000 metric tons, Cuban tobacco is famous throughout the world for its fine flavour, and is in great demand for cigars. Havana is the great cigar manufacturing centre of the island. The sandy plains west of Havana with rains in cool winter grow tobacco whose quality is known throughout. Tobacco planta tion plays an important role in the economy of Cuba.

A considerable quantity of tobacco is grown in Java Sumatra and the other lands of Indonesia. In 1969, the total production of tobacco in Indonesia was 130 metric tons. In recent years substantial progress has been made in Turkey which produced 146,000 tons in 1969.

Tobacco is one of the most valuable crops grown in India, which produces about 8 per cent of the world's total and ranks second after the U.S.A. among the producers. Only about 5 per cent of Indian tobacco compares favourably with good quality flue-cured Virgina. South Indian tobacco is used for cigarettes, cigars and cheroots, while that of North India for chewing and snuff.

Trade in Tobacco

The leading exporters of unmanufactured tobacco are U.S.A., Brazil, Bulgaria, Turkey, India and Greece. More than 25 p.c. of the world's exports in tobacco is handled by the U.S.A., followed by Rhodesia-Nyasaland with a little more than 10 p.c. Brazil is the fifth tobacco-exporter in the world. Bahia is the principal port of Brazil which does considerable trade in tobacco.

TOBACCO: WORLD TRADE (UNMANUFACTURED), 1970

('000 metric tons)

Exporters			Importers		
U.S.A.	...	243	Germany (W)	...	123
Brazil	...	55	U.K.	...	129
India	...	50	France	...	64
Turkey	...	71	U.S.A.	...	99
Greece	...	73	Netherlands	...	55
World Total	...	883	World Total	...	809
Regional Totals			Regional Totals		
Europe	...	161	Europe	...	587
North America	...	256	North America	...	105
South America	...	91	Asia	...	58
Asia	...	164			

In 1970, U.K. was the biggest tobacco-importing country in the world with 16 per cent of the world's total. West Germany was second in the list consuming 10 per cent of the world consumption. It is interesting to note that tobacco imports are on the decline in U.K. and on the increase in West

Germany. The vigorous propaganda against tobacco habits is one of the reasons.

Sugar, Fruits and Spices

Sugar[15] :— It is probably the most widely used of all food products. Nearly all sugar is obtained from the juice of two plants—the sugar-cane and the sugar-beet. Small quantities are also obtained from the sap of the maple tree, from sorghum, and from certain date and palm trees.

Sugar-cane is a perennial grass that grows from 8 to 24 feet in height and belongs to the tropical and sub-tropical regions. Cane plant requires a high temperature and ample rainfall and frost-free climates. Certain short maturing varieties can be grown in the sub-tropics as well, but the yields are generally low. An annual rainfall of at least 45 inches is necessary, but before harvest a dry weather helps to store up sucrose in the stalk. Tropical Savanna, with a long wet season and a short dry period, offers ideal climatic conditions for sugar-cane. The soil must be well drained and should have salt and lime in it ; so it grows best along the sea-coast. Sugar-cane depletes soil very quickly. Fertilization is therefore practised in sugar-cane fields. The plant requires little attention during its growth but an abundance of cheap labour is necessary in harvesting the crop and preparing the material for export. The cane plant is subject to many diseases and attacks by insects throughout its growing life, and therefore needs careful attention to prevent deterioration in quality.

The world production of sugar-cane is between 450 and 500 million tons, distributed unevenly over the different continents. Central America is the leading producer followed by Asia, Africa, Australia and North America. Except for a small quantity of 400,000 tons in Spain, there is no sugar-cane cultivation in Europe. All other continents produce sugar-cane. The important sugar-cane-producing countries are India, Cuba, Brazil, Hawaii, Mauritius, the Philippine Islands, Dominican Republic, British Guiana, Formosa, Puerto Rico and Australia.

[15] India is supposed to be the original home of sugar-cane from where it was taken to east and west.

REGION-WISE SUGARCANE PRODUCTION

(In '000 metric tons)

		1948-52	1967	1969
Europe	...	322	460	420
Cuba	...	50,466	50,880	48,000
Mexico	...	10,419	24,028	24,000
South America	...	59,388	113,387	130,000
Asia	...	83,274	164,484	170,000
Africa	...	15,309	40,201	45,000
World Total	...	257,312	514,994	530,000

The cane-sugar constitutes the chief source of wealth to Cuba. Cuba supplies one-fifth of the world's sugar, both cane and beet. This means the development of enormous plantations and an immense investment of capital, binding up the prosperity and well-being of the people with the fate of a single crop. The production of sugar crop in 1971 was 4.8 million tons. Improvements in organisation and farming methods and progress in the use of fertilisers offset the damage that is often caused by drought.

India ranks first in sugar-cane production, but in actual production of raw sugar, the country is very much behind Brazil. From 97 million tons of sugar-cane in India, the production of raw sugar was 4·3 million tons in 1970. Brazil obtained 4 million tons of raw sugar from 77 million tons of sugar-cane in the same period. Although the crop is grown throughout Northern India, the chief area of production embraces the middle and the upper regions of the Gangetic plain. Brazil is the second largest producer of sugar-cane where its government has always taken keen interest in this industry to encourage the production.

The cane-sugar industry has an important place in the national economy of Java. High profits arising out of the industry have induced the growers to cultivate sugar extensively. Its cultivation largely replaced rice.

Because of climatic and economic factors, the yield of sugar-cane per hectare differs from country to country.

YIELD OF CANE-SUGAR PER 100 K.G/HECTARE

		1968			
Hawaii	...	2,299	Fiji	...	49
Java	...	698	Philippines	...	50
Peru	...	1,448	Cuba	...	40
U.A.R.	...	920	India	...	47
Rhodesia	...	1,054	World average	...	52

The world production of raw sugar in 1971 was 43 million tons as compared to 20 million tons in 1948-52. Brazil produced 4 million metric tons, India 5 million metric tons Philippines 2 million metric tons, South Africa 1·5 million metric tons and Australia 3 million metric tons. The principal exporters are Cuba (4·4 million metric tons), Brazil (1 million metric tons), Philippines (1 million metric tons) and Australia (1 million metric tons).

Mauritius exports a little more than half a million tons of raw sugar from cane.[16] The people of the island virtually depend on the export of sugar. The efficiency and quantity of sugar-cane have been increased because of irrigation. The United Kingdom is the largest buyer from Mauritius.

PRODUCTION OF SUGAR FROM CANE

(1000 metric tons)

Country		1968	1971
Europe	...	44	52
North America	...	12,632	14,081
South America	...	7,768	9,325
Asia	...	8,138	9,613
Africa	...	4,305	4,427
Australia	...	2,768	2,524
World	...	38,105	42,747

The sugar beet is a native of the temperate zones, but can be grown in both marine and continental climates in middle

[16] The overwhelming dependence on a single crop—sugar-cane—subject to sharp fluctuations in price makes the economy of Mauritius extremely vulnerable. Yet sugar has proved itself over the years as the crop best suited to the local climate and soil and thus the most profitable per acre.

atitudes and in subtropical areas. Sugar beet accounts for about one-third of the total sugar produced in the world. Sugar beet requires well-drained fertile loamy soil and is such an exhausting crop that heavy manuring is constantly necessary. Sugar beet requires a growing period of 160 to 170 days. The number of sunny days has an important effect on the sugar contents of the beet. Sugar beet seems to thrive best in a region with a continental type of climate, provided the rainfall is not too small.

In the face of cheap cane sugar, the cultivation of sugar beet has been influenced by a number of factors. Apart from the question of self-sufficiency, the beet-growing countries are technically highly advanced and their people have discovered effective processes for reclaiming sugar from molasses. The fear once entertained, that cane sugar would never allow the revival of beet sugar, is dispelled, and European countries are raising more sugar beets every year.

PRODUCTION OF BEET-SUGAR

(In '000 tons)

Country		1968	1970-71
Europe	...	14,402	14,564
North America	...	3,295	3,021
Asia	...	1,604	1,622
World	...	30,430	29,734

The chief producers are U.S.S.R., West Germany, France, U.S.A., Czechoslovakia and Poland. The important exporters are West Germany, Czechoslovakia and Poland. The United States is the only country where sugar-cane and sugar-beet are both produced. Also, the two regions of production in the United States are small and remote from each other. The chief regions for beet production are the irrigated valleys of the Great Plains from Montana to South Colorado, Idaho, Utah and the coastal plain of California. California is the main grower of sugar-beet in U.S.A.

Soviet Union is the leading sugar-beet-producing country in the world. It has about 3.7 million hectares under sugar-beet cultivation which corresponds to 48 per cent of the world's

sown area of sugar-beet. It raises about 87 million tons which is one-third of the world's total. Trans-Caucasia, West Siberia and south and central European Russia are the cultivated areas. Recently its cultivation has extended to Kazakh, Khirgizia and the Far East. The average yield of sugar-beet in U.S.S.R. is about 229 per 100 kg/hectare and it is lower than the world average yield of 295. Poland has increased her production in recent years. From 5 million tons in 1948-52, the production was about 16 million tons in 1968, making the country the second largest producer in Europe, next to U.S.S.R. Similarly, the production in West Germany has doubled during the same period. In contrast, France which was the leading producer of Europe after U.S.S.R. till 1957 has come down to fourth position in 1968 with 13 million tons.

The exporters of raw sugar from beets are France, Poland, U.K., Czechoslovakia and Belgium. The total exports from Europe in 1969 was 1.7 million metric tons. In Italy, 80 p.c. of sugar-beets are grown in the Po-basin, and its yield per hectare is 391 per 100 kg/hectare.

Fruits :— Fruits are grown all over the world. Formerly, the demand for fruit was confined to the outlying areas as it could not be preserved on account of time taken in covering the distance from the growing areas to markets and, therefore, it was not an important item of foreign trade. The invention of cold storage methods, and the introduction of a fast transportation system have greatly helped the movement of fruits from place to place. For commercial purposes, fruits of tropical and temperate regions are important.[17]

Tropical fruits:—Banana, mango, date, guava, pine-apple and melon are some of the chief fruits of the tropics.

Of all tropical fruits banana is the most important. It is not only one of the staple articles of food in many equatorial regions where it is grown but is in great demand in the temperate regions also. The banana plant requires warm climate and abundant rain. Consequently, it is grown in the West Indies, Central America, North of South America,

[17] Fruits can also be divided under four heads:—*Hard fruits*—apples; *citrus fruits*—oranges and lemons; *soft fruits*—pears, plums, apricots, peaches, grapes, etc.; and *bananas*.

Jamaica, Costa Rica, Colombia, Honduras and Guatemala, from where it is mainly exported to the U.S.A. and Europe. India is a large producer of bananas, but as the internal consumption is also high, there is practically no export of this commodity. Of late, however, efforts are being made to increase the production so as to export the surplus to U.S.S.R. and other East European countries. The estimated world production of banana in 1967 was about 26 million tons, of which Brazil alone contributed 20 p.c. Continent-wise, South America raises about 45 p.c. of world's banana. The U.S.A. is the largest single importer of banana and takes about 40 per cent of the world's total export. The Western Hemisphere supplies about 85 p.c. of the bananas entering international trade and the rest comes from Africa. Four countries—Costa Rica, Honduras, Ecuador and Colombia—account for 60 per cent of the world's total export. Ordinarily, North America takes 48 per cent, Europe 42 per cent and South America 8 per cent of the total banana exports of the world.

The pine-apple is cultivated in Hawaii, Cuba, Mexico, Philippines, Puerto Rico, Malaya, Formosa and Australia. As a plant it requires high summer temperature with no frost. The rich exporting countries are Hawaii, Mexico and Cuba. Of the total world production of pine-apples, 60 per cent are for export. The production of pine-apple has increased from 1.4 million tons in 1952 to 4 million tons in 1969. The contribution of Far East is one-third of the world's total.

Mango is a very delicious fruit of India and Bangladesh but up till now its export is small. The main problem is that of preservation. Mango in its ripening stage cannot retain freshness for long and consequently needs immediate markets. Secondly, even in the case of varieties which can retain their freshness, all mangoes are not disease-free. Britain, France, Czechoslovakia and West Germany impose no restriction on the import of Indian mangoes provided the mangoes are certified as disease-free. The import of mangoes is not allowed today in Australia, the U.S.A., Italy and Japan. Date is essentially a product of the desert; it grows extensively in Iraq, Algeria, Iran, and North-West Pakistan. It is an important article of commerce, and is in great demand in Europe and the U.S.A. The estimated world production was 1.9 million tons in 1967,

of which 24 per cent was put in the international markets. Another widely used tropical fruit is cocoanut, but the general demand is more for copra than for the fruit.

Temperate fruits:—Temperate fruits may be divided into two groups: (1) warm temperate fruits, (2) cool temperate fruits.

The coast-lands of the Mediterranean fall within the warm temperate zone. The climate is distinguished by warm summer, mild winter and winter rain. In these areas citrus fruits like oranges and lemons grow abundantly.

Olive is important as a fruit and also for its oil. It is a native of Asia Minor and is strictly limited to the Mediterranean climatic regions. Plenty of cheap labour is necessary for picking olives by hand. The important olive-producing regions are Spain, Italy, Greece, Portugal and Tunisia. Olive oil is used for the manufacture of soaps. It is also employed for cooking, lighting and medicine preparation. Italy produces about 40 per cent of the world's total olive oil production, followed by Spain with 30 per cent and Greece with about 8 per cent. The olive-exporting countries are Italy, Greece, Tunisia and Algeria.

For successful cultivation, grapes require well-drained land with a sunny warm season and, therefore, the Mediterranean regions are the best. The chief grape-producing countries are France, Italy, Spain, Southern Russia, Algeria, Greece, Western Asia, California, parts of Argentina, Cape of Good Hope, Chile and South Australia. About 22 p.c. grapes of the world are raised in Italy and 18 p.c. by France. Grapes are marketed in three forms, *e.g.*, fresh for table consumption, dried as currants, and juice as wine.

In spite of the world production being more than 52 million tons, the actual export of grapes does not exceed three-quarters of one million tons. About 90 p.c. of the exports are from European countries. U.S.S.R. is the largest importer of grapes in the world.

Apples have uses for table consumption, dessert and cider, and are found in almost every continent. Its concentration is the largest in Europe and North America, the former raising about two-thirds of the world total, and the latter about one-fourth. The apple is extensively raised in the U.S.A., France,

Italy, Germany and England. The world production of apples is around 20 million tons. France is the leading country in production and supplies about 12 per cent of the world's total. Apples are also grown best in Canada, Tasmania, New Zealand, Australia and Nova Scotia. Great Britain also grows apples of high quality, but the quantity is too small for foreign trade.

About two-thirds of the world's apples are used for dessert. The world trade in apples is of the volume of 1.5 million tons, and the leading exporters are Italy, Hungary and Argentina. West Germany imports about 25 p.c. of the total.

Spices :—From very early times there has been trading in spices, which are important not only for improving the palatability of food, but also for the preparation of flavouring oils. Spices are mostly the products of the tropics. Generally high temperature and heavy rainfall are required for the cultivation of most of the varieties.

Of innumerable spices of the tropics, pepper, ginger, cloves and cinnamon are important for foreign trade.

Pepper is the berry of a vine-like climbing plant which is grown extensively in Indonesia, Malaysia, Thailand, and the Malabar Coast of India. Taking the world as a whole, India is now the world's largest pepper producer with a yearly output of around $\frac{1}{2}$ million cwt. Next in terms of output is Indonesia —420,000 cwt., followed by Sarawak and Ceylon. It is put in the market in two varieties—black pepper and white pepper. It is called black pepper when the whole berry is ground, and white pepper when it is powdered after removal of the outer skin. Malaya is the leading pepper-importing country in the world from where it is re-exported to other countries.

The principal exporters are India, Indonesia, Spain and West Indies. India exports about 30 p.c. of the world's total, Indonesia (42%), Sarawak (21%) and Cambodia and Malayasia (3%). U.S.A. is by far the largest market for pepper, taking over three times the amount imported by Soviet Union, the next biggest market.

Chilli is the product of an entirely different plant which originated in tropical America. It is a small pod which is dried in the sun before being put in the market. It is extensively grown in the tropics of Asia, Africa and America.

Ginger is the underground stem of a plant indigenous to

South Asia and is put in the market in fresh as well as sun-dried conditions. The large-scale cultivation of ginger is confined to South America, West Africa, China, India and West Indies.

Cloves are dried, unopened flower buds of "eugenia caryphyllata" and are used not only in cooking, confectionery and liquors but also as source of oil which is largely used in perfumery. Tanzania contributes four-fifths of the world's supply of cloves. The other countries producing cloves are Penang and India. In India it is cultivated in the Madras State.

Cinnamon is the dried bark of a small evergreen tree, native of Ceylon. The cultivation has spread to Brazil, West Indies, Indonesia and China. Apart from its use a spice, it is also important for its oil which has medicinal properties. Southern India produces considerable quantities of cinnamon.

The other spices are nutmegs, mace, vanilla, all-spice and cardamoms.

Though the tropics are noted for the production of many kinds of spices, a number of plants furnish spices in the temperate regions as well. Among these are mustard, soya, caraway seeds, coriander seeds and aniseed.

Mustard is obtained from the ground seeds of mustard plants which grow in many parts of Europe. Coriander seed is in demand for its use as a flavouring element in confectionery. Soya sauce is in great demand in Japan and Manchuria to improve tasteless food like rice.

Sago :— It is a very nutritious and easily digestible food. The sago-palm requires heavy rain and high temperature, and is grown in swampy places. It grows to a height of nearly thirty feet and has enormous long leaves. Indonesia and the Malaya Peninsula contain extensive sago plantations.

Arrowroot :— It is obtained from the tubers of a plant which grows from two to three feet in height. The plant is cultivated in the West Indies, Indonesia, Bengal and other tropical countries.

Degree of Self-sufficiency in Food

The degree of self-sufficiency in food is related to the economic condition of a country. If the country is backward

agriculturally, there will be food shortage in spite of large area. Also, if a country is highly industrialized and its size is too small to permit agriculture on a large scale, there will be food shortage.

Increasing Population and Food Grains Position

In advanced countries of the West, food accounts for about 30 to 40 p.c. of one's expenditure compared to 55 p.c. in Asian countries. Another significant fact is that output of agricultural food has been increasing mostly in the advanced countries, while in developing countries, the increase in output is very slow in spite of their urgent need for it because of the present rate of growth of population. For every future increase of 100 million population, the world will need about 13 million tons of additional food in cereals. The world population is likely to increase within next 15 years by 100 millions. This means that the cereal production must also increase in the same period by 130 million tons. This increase in food production can result from an increase in the cultivated areas and a wider application of coordinated planning technique on a world basis. An increase of three-quarters can be attained by enlarging the world's cultivated area of 3,600 million acres to 4,000 million acres and raising the yield per acre by 50 per cent. Further, the area now under food crops can be made to yield some 20 per cent more through the introduction of scientific methods. It has been estimated that 1,300 million acres can be added to the present area: 900 million acres in South America and Africa; 100 million in Sumatra, Borneo, New Guinea and Madagascar; and 300 million in U.S.A., Canada and U.S.S.R. The Food and Agricultural Organisation is now working on an *Indicative World Plan* for agricultural development up to 1975 and 1985. It is laying down targets for the various sectors of agriculture to reach to end starvation, and will outline the priorities that should be given to agriculture in economic growth. The Plan will provide an international framework for the individual national plans of developing countries.

In recent years there has been great emphasis on the developmental plans in agriculture in most developing countries because of occasional drought conditions and the difficulties of getting supplies from abroad. The intensive use of fertilisers,

the introduction of modern farming techniques and of high yielding varieties of wheat and rice are becoming more common in areas where the conditions are favourable. Unless the involvement of the government extends to all areas in a country the food supply developments will continue to be inadequate.

Distribution of World Fibre Crops

Cotton :—From the point of view of agriculture, cotton refers to the plant which has long been used for its fibre and seeds. It is said that as early as 1,500 B.C. the cultivation of cotton and its use were known in India. Today, cotton provides the civilized world with about 70 p.c. of the total apparel fibres consumed. There is no other plant that comes so close to the civilized man and none which he uses so much every day.

It has a considerable climatic range ; but it grows well in warm, moist and even climates where the summer is long and where there is salt in the soil. Its commercial cultivation is more successful in areas which are free of frost for at least 200 days and have a temperature of 70°F or more during the period. Sea breeze is beneficial for the quality of the fibre. So the ideal situation for a cotton plantation is on lowland near the sea or preferably on islands in tropical or semi-tropical latitudes. Except for areas which have irrigation facilities cotton requires about 20 inches of rainfall. Cotton does not do well in areas of heavy rainfall. Although cotton may be produced in any kind of soil, it grows well in light, sandy soils, or loams and on heavy clay.

U.S.S.R. is by far the greatest producer of raw cotton. Next in order are the U.S.A., India, China and U.A.R. These five countries together produce the bulk of the world's crop. The other important producing countries are Brazil, the Sudan, Pakistan, Mexico, Peru and Uganda. With regard to continent-wise distribution, the interesting fact is that North America raises about one-third of the world's cotton in about one-fifth of the world's cultivated area under cotton.

The sharp expansion in cotton production in recent years has been mainly due to steadily rising yields per hectare. Also there has been increase in areas under cultivation in centres

American countries, the Middle East, India, Pakistan, Brazil and certain African countries. The world average yield per 100 kg/hectare in 1969 was 3.5 compared to 2.4 in 1961. Many factors have contributed to the increase per hectare, and some of these are greater use of fertilizers, better agricultural practices, elimination or reduction of marginal land and increased share of irrigated lands.

COTTON (LINT): PRODUCTION

('000 metric tons)

	1948-52	1965	1967-68	1970
Europe ...	60	180	193	190
U.S.S.R. ...	970	1,865	2,052	2,310
U.S.A. ...	3,105	3,256	1,624	2,236
Brazil ...	395	662	564	717
India ...	485	973	1,001	942
Pakistan ...	245	417	520	539
Sudan ...	74	163	179	225
Egypt ...	396	520	437	500
WORLD TOTAL ...	7,479	11,477	10,380	11,574

Of the several species cultivated for market, three are prominent. The most important is *Gossypium hirsutum,* popularly known as *upland cotton.* It grows extensively in U.S.A., Mexico and Central America. A second type is *Gossypium barbadense,* commonly known by names like Egyptian cottons, Sea Island cottons and Peruvian cottons. These cottons are longer than upland cotton in respect of staple. A third group is *Gossypium Arboreum,* and contains short staple. However the cotton varieties are known more commonly as Upland, Sea Island, Egyptain and Peruvian. Egyptian cotton is specially suited to the manufacture of goods requiring a smooth finish and is less expensive than sea-island cotton. Peruvian cotton possesses a rough, strong fibre, similar to that of wool. It is well adapted to mixing with wool and is used in the manufacture of underwear and hosiery. Upland cotton is the most widely used and the most abundant of all varieties.

Recently there has been a tendency in almost every cotton-growing country in the world to increase the output of upland and sea-island cottons.

There is definitely a tendency for world cotton production to outstrip consumption. The world cotton carry-over which was about 30 million bales in 1945 has been 298 million bales in 1966. This carry-over has become a burdensome surplus. Although world cotton consumption is now at an all time record high, the cousumption of other fibres has also shown similar trend. The fact is that the cotton's share in the fibre market is on the decline. From its share of 72 p.c. in 1954, it came down to about 60 p.c. in 1968. The decline is mainly from the phenomenal growth of chemical man-made fibre industry.

U.S.A. grows nearly 18 per cent of the world's commercial crop. In the U.S.A., the planting months are from March to May while the picking dates are from August to December. The cotton area stretches in one big belt from North Carolina to Texas. The chief cotton-producing States of the U.S.A. are Texas, Mississippi, Arkansas, Alabama, Georgia, North and South Carolina, Louisiana and Tennessee. Mechanical harvesters are being used although a large percentage of cotton is still handpicked. Cotton cultivation is associated with insect pest, and the measures for control are spacing, methods of cultivation, crop rotation, etc. The U.S.A. cotton consists of two varieties—the Sea-Island and the Upland. Much of the produce goes to the U.K. The principal cotton ports are Galveston, New Orleans and Savanna. The area devoted to cotton in the United States registered a decline of 8 p.c. between 1961 and 1968 but the actual production decreased by 25 p.c. during this period.

U.S.S.R. is the leading cotton producing country in the world, taking over the first position from U.S.A. in 1967.

The reason for Soviet leadership in cotton production is not that the production has increased—in fact it has always been around 2 million metric tons a year, but that the U.S.A. has reduced its production from 9.7 million metric tons in 1948-52 to 2.2 million in 1970. The principal cotton growing regions of the U.S.S.R. are: Central Asia, Southern Kazakhstan and Transcaucasia where there has been considerable development of canals, dams and water-reservoirs for irrigation. Russia produces more cotton than India and Pakistan taken together.

India has the largest acreage of land under cotton cultiva-

tion in the world. In respect of production, however, her position is third, being preceded by the U.S.S.R. and the U.S.A. Indian cotton is mainly produced in the fertile volcanic black soil area of the Deccan. In India, the plant is grown from March to September, and the pickings are done from September to November. Pakistan raises cotton mostly of upland variety. Of late, both in India and Pakistan, the proportion of crop larger than $\frac{7}{8}''$ has increased substantially, although the bulk of the crop is still shorter than one inch. Egyptian cotton is grown in the Nile Valley from February to April and the picking months are August to October. Because of fertile soil and favourable climate in the Egyptian delta, the quality of Egyptian cotton is the best in the world. The yield per acre is also very high there. The chief port from which it is exported is Alexandria. Brazilian cotton is cultivated on the coastal low-lands and is exported from Bahia and Pernambuco. The prosperity of Uganda has been closely bound up with the cotton crop ; the extension of roads and railways and the expansion of towns are due to the rapid progress made in this industry during the last twenty years. Congo is becoming an important producer of raw cotton, and raises about 60,000 metric tons every year.

Cotton is a very important article in international trade although world cotton consumption is less than the total production by 5 p.c. The failure of consumption to expand in the traditional importing countries has influenced the level of world cotton trade. The cotton surplus problem looks for its solution to increasing demand from warm climate countries where cotton is overwhelmingly preferred to other fibres. There is little chance for cotton's revival in developed countries.

U.S.A., U.A.R., Mexico, Sudan, Pakistan, India and U.S.S.R. are the principal cotton-exporting countries of the world.

EXPORTERS OF COTTON ('000 TONS), 1969

U.S.A.	...	544	Sudan	...	172
Mexico	...	370	Uganda	..	53
Pakistan	...	106	Turkey	...	203
India	...	32	Syria	...	124
Egypt	...	253	WORLD TOTAL	...	3,110

In the shares of export in raw cotton trade, North America and Central America have 35 p.c. and Africa 25 p.c. So far as the imports of raw cotton are concerned, Europe takes a little more than 1.5 million metric tons, and Asia about 1.3 million metric tons. The principal buyers of raw cotton in Europe are West Germany, France, U.K., Poland, Italy and Czechoslovakia. Japan is the largest importer of raw cotton in the world. In 1969 she imported about 677,000 tons of raw cotton.

Measures are being taken to grow more cotton in various regions. Northern Nigeria, Nyasaland, Tanzania and Kenya can produce huge quantities of cotton. Already the Sudan has made much progress in cotton cultivation. A great dam at Sennar on the Blue Nile has been constructed to irrigate the Gezira district which has been raising cotton of improving quality in increasing quantity. Southern Rhodesia has emerged as a fairly important grower of raw cotton in recent years. From 1,000 tons in 1964, the production went up to 13,000 tons in 1970.

West Indies can grow more long-staple cotton of Sea Island type than they do now. Cotton cultivation in Russia is confined to Trans-caucasia and Turkistan. In recent time it has been extended to the Crimea, Black Sea coast, the coastal region of the Sea of Azov, and the Ukraine. There are also great possibilities of cotton cultivation in Mexico, Korea and Manchuria.

In spite of the spread of cotton cultivation and the increase of population in the world, the manufactures of cotton are not in a buoyant mood because of the inroads made by man-made fibres in the expanding markets of the world. In many cases the synthetic manufacturers aim at identical markets. The synthetics are also competing with rayon and wool. The blending of cotton with man-made fibre has already become popular.

Jute[18] :— Supposed to be indigenous to India, jute has acquired great importance as a fibre crop. It is mainly used for the manufacture of cordage, carpet, coarse gunny cloth and sacking. "The demand for jute in the world's market is based

[18] This is called "Patta" in Sanskrit and "Pat" in Bengali. It is a bast fibre found between the bark and the inner portion of the stem.

upon the fact that no other cheaper fibre is procurable for bagging agricultural produce." Although many fibres are now available for commercial use, jute still continues to hold the field as a fibre which can be produced at an exceptionally low cost and is consequently suitable for the production of a wider range of articles. As a fibre, jute is inferior to many other fibres because it loses its whiteness and strength comparatively quickly. Nevertheless, its fineness, lustre, its capacity to absorb colours and, above all, its cheapness have made it very useful as a fibre.

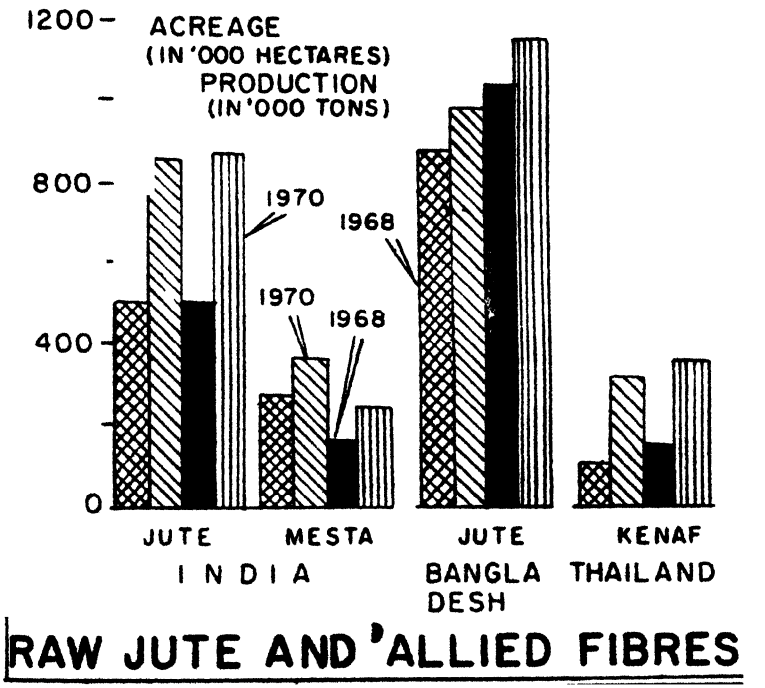


FIG. No. 21 Raw Jute and Allied Fibres

Jute is a tropical plant and generally grows to a height of 5 to 10 feet.[19] Jute is a tropical plant, but its cultivation is

[19] The commercial jute fibre is obtained from two species of plants belonging to the order *Tiliaceae*. Both these plants grow to a height of from 5 to 10 feet. In general, the fibre varies from 4 ft. to 10 ft. in length. The stem of the plant is round, about half an inch in diameter. (*Jute and Jute Spinning* by Woodhouse and Kilgour).

confined almost exclusively to the lower Gangetic plain of India and Bangladesh. The necessary conditions for the successful cultivation of jute are : (*a*) high temperature with a minimum of about 80°F during the period of growth; (*b*) suitable soil; (*c*) sufficient rainfall; (*d*) distribution of rainfall over the period of growth; (*e*) an ample supply of water for soaking the plants and for washing the stripped fibre; (*f*) a suitable and efficient supply of labour to handle the crop at the proper time; and (*g*) facilities for placing the fibre on the market. The plants are grown in three different kinds of soil:—(*i*) rich sandy loams of high lands ; (*ii*) *churlands, i.e.,* alluvial soils which are situated in the neighbourhood of the river tracts and which are flooded during the rainy seasons; (*iii*) low lying lands on the sides and in the deltas of the rivers.

All the above climatic, physical and human factors are found in Bangladesh and lower Gangetic Valley of India. The quality of the fibre and the yield per acre depend in a large measure upon the preparation of the soil. Bangladesh jute is strong and hard and suitable for the manufacture of high-grade hessians. Brazil, Ceylon, Formosa, China, and Malaysia also grow jute. *Brazil has prepared a five-year plan called "Salte" for a five-fold increase of jute production. The target has been fixed at 50,000 tons and this is expected to enable Brazil to dispense with supplies from overseas.* Jute may also be grown in Egypt, Iran, Japan, Mexico and Paraguay. In a botanical sense, China jute is not jute but a similar bast fibre, which was experimented with in the U.S.A. as American jute in 1880.

RAW JUTE AND ALLIED FIBRES (KENAF AND CONGO JUTE)

Country		Area ('000 hectares) 1968	1970	Production ('000 metric tons) 1968	1970
India:					
Jute	...	527	750	528	883
Mesta	...	280	350	163	239
Bangladesh	...	878	980	1,036	1,179
Thailand:					
Kenaf	...	112	325	140	360
WORLD	...	2,236	2,874	2,677	3,471

The average yield of jute per hectare is the highest in Bangladesh with 1,700 kg. compared to 1,200 kg. in India.

Kenaf, a product similar to jute is grown in many countries like U.S.S.R., Cuba, Brazil, Burma, Indonesia, Iran, Thailand, Vietnam, Congo, Madagascar and South Africa. The highest production in 1970 came from Thailand with 360,000 metric tons. India cultivates a similar plant, known as *mesta,* and its production is between 250,000 tons to 350,000 tons annually. Attempts to grow jute are being made in some countries. Java is likely to be self-supporting in future so far as jute bags are concerned. South Africa is experimenting with the fibre of a plant called *wild stokroos* which may prove suitable for the manufacture of wheat bags. This is now cultivated in East Transvaal. Experiments with locally grown banana fibre in the manufacture of grain bags are also being carried out at Umatali, Southern Rhodesia. The results have been encouraging, and bags have been made containing up to 30 p.c. of banana fibre and 50 p.c. of sisal and banana fibre combined. The bags appear to be as strong as normal bags made from 100 p.c. jute. According to FAO of U.N. forecast, there may be a surplus in world production of jute in 1972. Export supplies are estimated at between 8 and 9 lakh tons as against estimated requirements of 7 lakh tons, thus giving an exportable surplus of about 50,000 to 100,000 tons.

Although jute-like fibres are being cultivated in many countries, their yield per acre is comparatively low.

About 25 p.c. of raw jute is exported, of which Bangladesh accounts for about 90 p.c. followed by India and Nepal. The importers are U.K., West Germany, Japan and U.S.A. India occasionally imports raw jute.

Hard fibres :—The principal hard fibres are sisal, henequen and abaca (Manila hemp). All these are grown in developing countries and exported to developed countries. The Philippines and Mexico supply almost all abaca and henequen. More than 80 p.c. of world's sisal comes from Tanzania, Brazil, Kenya and Angola. Since hard fibres are mainly used as cordage, and since synthetic fibres like nylon, polyester and polyvinyl are being increasingly manufactured in developed countries, there is already a kind of keen competition between

hard fibres and synthetic fibres. The problems facing hard fibres arise from fluctuations of prices in the short term and imbalance between supply and demand over the longer run. The production of hard fibres in 1970 was 773,000 metric tons of which about 60 p.c. is put in the world markets.

The future of hard fibre industry will depend on price, productivity and effective marketing.

Hemp :—It is a plant grown both for fibre and for seed. The fibre is manufactured into cordage, sacking, sail cloth, twine and ropes. The seed is used principally for poultry food and its oil is an important constituent for certain paints and varnishes.

Hemp has a wide range of cultivation, for it is grown in tropical and temperate parts of the world. The plants after flowering are removed from the fields, dried in the sun and soaked in water for two weeks. The fibre is then separated from the wood by constant beating. Yugoslavia, Hungary, Italy, India, U.S.S.R. are the leading producers. About 40 per cent of the hemp crop is grown in Europe, and 30 p.c. in Asia.

The world production of hemp fibre in 1970 was about 298,000 metric tons of which 33,000 were exported. The average yield per hectare is the highest in Korea with 1500 kg and lowest in India with 400 kg.

Both in area and production, the U.S.S.R. holds the first position in the world. The principal growing areas are the Kursk and Orel Oblasts, Ukraine and Mordovia. Italy produces the best quality hemp though it ranks far below Russian hemp in quantity. Philippine Islands produce fine quality hemp known as Manila hemp, which is mainly used for ropes and cordage.

India is a great producer of hemp and it is grown in Tamil Nadu, Maharastra, Madhya Pradesh and U.P. Indian hemp is exported to the U.K., Belgium, Italy, France, Germany and Denmark.

The leading exporter of hemp is Yugoslavia. She handles about one-fifth of the world's total export. The other countries are Hungary, India, U.S.S.R., Italy and Poland.

Flax :—It is cultivated both for fibre and for seed. The seed is of importance for the extraction of oil which is used in the manufacture of paints and varnishes, while the fibre is

used for twine and canvas as well as for various types of linen cloth.

The two products—fibres and seed—rarely come from the same plant. In tropical and sub-tropical areas flax is grown for seed, while in cool temperate areas it is raised for fibre. The cultivation of flax is largely confined to those lands where there is a dense population, for heavy manual labour is required in pulling up the plant by the roots, removing the seeds with comb and wetting the straw to cause soft parts to rot, when fibre will be separated from them. Consequently it is mostly raised in the U.S.S.R., Italy, Poland and France. The U.S.S.R. holds the first place with regard to flax fibre. She had 484,000 metric tons of production in 1967. The principal flax raising areas are Kalinin, Leningrad, Byelorussia and Kirov which are all parts of the U.S.S.R. In U.S.S.R. flax production has now been mechanised to a great extent.

The world production of flax fibre in 1970 was about 630,000 metric tons, of which the U.S.S.R. contributed 725,000 metric tons. About 380,000 tons of flax were exported by different countries of the world in 1969. U.S.S.R. is the leading exporter, followed by France and Netherlands.

PLANTATION RUBBER AND OILSEEDS

Plantation Rubber :—Long before the Western countries knew anything about the existence and use of rubber, it was already well-known to the South American Indians, who made boots and bottles out of it. The discovery of several kinds of latex producing trees in South America by two Frenchmen in 1743 led to efforts for finding out its uses, and by 1790 it became known as an industrial article in U.K.[20] Today, rubber is an article of tremendous industrial importance. Natural rubber is found in three areas of the world—South-East Asia, Tropical South America and Tropical Africa.

Rubber is obtained either from plantation or from wild

[20] The first commercial use of rubber was as erasers, hence the name 'rubber'. As its qualities became known, it was put to more and more uses, such as the manufacture of water-proof fabrics, soles for footwear, sports gear and bicycle and vehicle tyres. However, it was the beginning of the motor car industry at the turn of the present century which first created the huge world demand for rubber.

rubber trees. The rubber tree is found in areas having a heavy rainfall and a rich, deep, loamy soil which is well-drained.

It is, therefore, grown in the equatorial areas like the Congo basin, the Amazon basin, Indonesia and Malaysia.

Plantation rubber is now an important industry and the output is increasing with tremendous strides. Till 1898 all rubber was derived from the wild trees of South and Central America. Even, in 1900, plantation rubber accounted for only 4 tons. By 1930, however, 96 per cent of the world production of rubber was plantation rubber.

Wild rubber mainly comes from Brazil, Colombia, Venezuela and Congo. In Brazil, it grows in the Acre Territory, Amazon and Para. In 1970, Brazil produced about 25,000 metric tons of rubber as against its peak production of 43,000 tons in 1912. Wild rubber constitutes a substantial portion of the total natural rubber production of Brazil. Of late, however, wild rubber production has become unprofitable in many regions of Brazil and vigorous steps are being taken by the government to develop rubber plantations. The fact that during the second World War, the supplies of natural rubber from South East Asia could not be obtained by the U.S.A., led to the development of more rubber plantations in Brazil and other States of South America. A recent feature of Brazilian economy is the growth of synthetic rubber, and its competition with natural rubber. Yet there was no production of synthetic rubber in Brazil till 1961. Naturally, the consumption of synthetic rubber is on the increase in Brazil, and in 1968 it accounted for 65 p.c. of the total rubber consumption in that country. During the last ten years, the annual production of natural rubber has remained more or less the same which suggests that increasing consumption in Brazil is met by synthetic rubber. The gathering of wild rubber in Venezuela was resumed in 1942 and it is still continued. Congo has 56,000 hectares of rubber plantations and exports about 18,000 metric tons of rubber a year.

There are many difficulties in collecting wild rubber. The rubber-gatherer must laboriously open long paths from tree to tree and must trudge for miles each day through mosquito-infested swamps to gather a few pounds of latex. Moreover, the wild rubber areas like the Amazon and Congo basins are hundreds or thousands of miles inland and some of the districts

are remote from the trade routes. On the other hand, almost all the important rubber plantations are conveniently situated near the sea-coasts of Asiatic tropics and along one of the world's greatest sea-routes. Plantation rubber has made it possible (*i*) to reduce the labour of gathering latex, (*ii*) to take advantage of the cheap and abundant labour supply of more densely populated parts of the tropics, and (*iii*) to locate the industry near good and convenient trade routes. One inherent disadvantage of natural rubber is that its supply is highly inelastic as it takes six to seven years for rubber trees to come into bearing and another five to six years for them to become fully productive.

The production of natural rubber in 1970 was 2.9 million metric tons compared to 1.7 million metric tons in 1948-52. Most of the rubber plantations are found in the Far East, and 98 per cent of the world's plantation output comes from this region. In 1970, the Far East raised 2·6 million metric tons. The important plantation areas in the Far East are Indonesia, Malaysia, Ceylon, Cambodia, Vietnam and Thailand. Malaysia is today the world's leading producer of rubber being followed by Indonesia. This natural rubber production in 1970 in Malaysia, was 1200,000 metric tons. There are now in Malaysia over 3,300,000 acres under rubber and the industry supports two millions of the five million people in Malaysia. In Indonesia, most of the rubber is obtained from big estates.

Of late, the production of natural rubber in Africa has increased considerably. The total production of natural rubber in Congo (Leopoldville), Liberia and Nigeria in 1970 was 210,000 metric tons as against 38,000 tons in 1948. In South America, Brazil and Peru are the two producers of natural rubber.

NATURAL PRODUCTION OF RUBBER

('000 metric tons)

	1967	1968	1970
Brazil	21	22	25
Ceylon	143	149	157
India	63	67	89
Thailand	214	260	287
Indonesia	710	—	770
Malaysia	940	1,050	1,200
World	2,476	2,634	2,904

Rubber is a major source of foreign exchange for five countries in Asia and is of considerable importance in the exports from west and central Africa. Malaysia, Indonesia, Thailand and Nigeria are the principal natural rubber exporting countries in the world. Of the total exports, rubber normally accounts for 50 to 58 p.c. in Malaysia, 40 to 50 p.c. in Indonesia, 15 to 20 p.c. in Thailand and 5 to 10 p.c. in Nigeria. The principal importers are U.S.A., U.S.S.R., Singapore, West Germany, U.K. and Japan. About one-sixth of the world imports is taken by the U.S.A.

From the early days of the rubber industry, there has not been much correlation between supply and demand, and this is often responsible for violent fluctuations in the price of rubber to the prejudice of planters. The degree of maladjustment increases by the fact that whenever there is a rise in price, there is immediately an expansion of cultivation, despite the fact that there may be no real increase in demand.

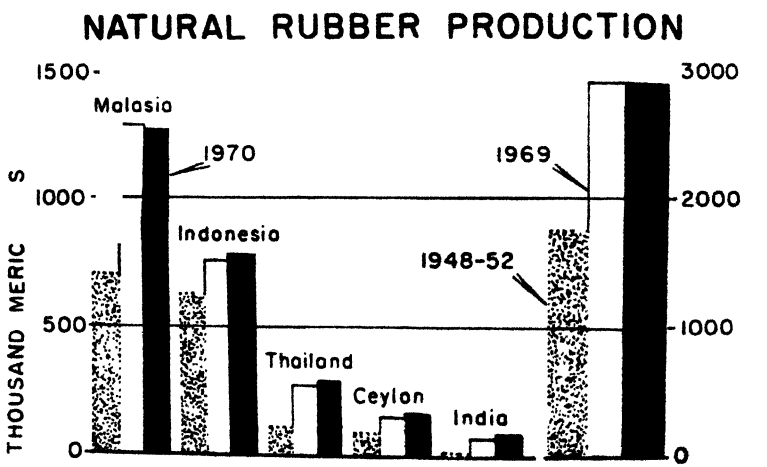


Fig No. 22. Natural Rubber Production

In 1934, an international rubber restriction agreement was reached in which all the territoies of South-East Asia producing rubber joined. The scheme had the objects of regulating the production and export of rubber in order to reduce the existing world stock and maintain an equitable price level.

reasonably remunerative to efficient producers. Production and export of rubber were prohibited beyond the agreed quotas. The agreement was abandoned in 1944.

In 1966, the International Rubber Study Group came to the conclusion that an efficient natural rubber industry could compete only on a cost basis with synthetic rubber and decided to reduce the cost of production of natural rubber and to improve its competitive efficiency. Since then, the producing countries are having financial and technical assistance from within and outside.

Oil-Seeds for Vegetable Oil :— Almost all vegetable oils are extracted from fruits or seeds. Oils are essential constituents of all forms of plant life, and every species of plant produces some quantity of oil in its life cycle. All plants, however, do not give sufficient oil to encourage their extraction for use by men. Only about seventeen sources are there for vegetable oils. Vegetable oils are in demand not only for salads and other food, but also for preparing perfumery, varnishes, lubricants, candles, soaps etc., as well as for various other purposes.

The sources of vegetable oil are cotton-seeds, coconuts (copra), palm nuts, rape-seeds, sesame, peanuts or groundnuts, linseeds, soya beans and castor-seeds, most of which are found in the tropics and sub-tropics.

Olive is a product of the Mediterranean region. The oil is extracted for cooking and salads and for use in spinning, weaving and soap-making. Spain, Italy, Greece, North Africa, Portugal and Southern France are noted for oilve oil. The world production of olives in 1969 was 6·2 million metric tons of which Italy supplied 1·9 million tons, and Spain about 1·4 million tons. During 1969, the production of olive oil was 1·9 million metric tons. The production of olive oil in 1969 was from Spain 380,000 tons, Italy 520,000 tons, and Greece 173,000 tons. The principal exporters of olive oil are Spain, Turkey, Tunisia, and Italy. *Cotton-seed* oil is a good substitute for olive oil, whose demand for industrial purposes is greater than that of any other seed-oil. U.S.A., India, Egypt and Brazil are large producers of cotton seeds. The principal exportes in order of importance are Nicaragua, Nigeria, Syria and Turkey.

The *coconut-palm* makes four principal contributions to commerce, *viz.*, (*a*) copra, *i.e.*, dried kernel of the nut, (*b*) coconut oil, (*c*) residual cake, and (*d*) the fibre derived from the husk surrounding the nut. The oil which is extracted from copra is in demand not only for food but also for soap-making. Coconuts are largely found in the Philippines, Indonesia, Ceylon, Southern India and some islands of the Pacific. In some cases oil is extracted and exported from the producing countries, in other cases, the trade is in the form of copra. Two-thirds of the coconut oils supplies are destined for food products and the rest for inedible uses. About 18 per cent of total supplies is used for soap. Food uses largely consist of margarine, shortening, biscuits, confectionery and others.

Philippines, Indonesia and Ceylon are the chief exporters of copra and coconut oil. Philippines alone accounts for 40 p.c. of the total exports. India is more important as a producer of coconuts, but as an exporter of copra and coconut oil her position is insignificant. The world production of copra is around 3·5 million tons, of which the Philippines contributes one million tons. The largest importer of copra cake and meal is West Germany (about 70 p.c.), followed by Denmark and Sweden. About 78 per cent of world production is exported.

Groundnut is grown as an annual crop in most tropical and sub-tropical countries, requiring a light soil, with well-defined wet and dry seasons and a rainfall of 25 to 40 inches. It is an adaptable crop and can be grown by rotation with maize, millets and sorghum. The main importance of the nut is in the production of oil. The oil content of the groundnut is about 42 per cent while the residual press-cake forms a valuable cattle food. The nut is also used in the confectionery trade and for making peanut butter.

GROUNDNUTS: AREA AND PRODUCTION

	Area (1000 hectares)			Production (100 metric tons)		
	1948-52	1967	1969	1948-52	1967	1969
Nigeria	970	1,020	1,214	690	1,252	1,500
U.S.A.	914	567	586	839	1,122	1,158
India	4,379	7,554	7,091	3,197	5,829	5,500
Senegal	675	1,147	1,191	558	1,114	890
World total	18,725	18,529	17,618	9,572	17,416	16,511

Groundnut is cultivated in India, Brazil, East Africa, China, the Philippines and Korea. The average yield per acre is 600 lbs. in India and 500 lbs. in Nigeria.

In 1969, about 1·4 million tons of groundnuts, cakes and meal were exported by different countries. India is the largest exporter, and her share is more than 45 p.c. of the world's total. The other exporters are Senegal, Nigeria, Argentina and Brazil. About 30 p.c. of the exports are taken by U.K. France and West Germany are also important buyers.

Linseed is merely another name for flax seed, which is chiefly used in the preparation of paints and varnishes and oil-cloth.[21] Linseed is largely grown in Argentina, U.S.S.R., India and U.S.A.

Argentina and U.S.A. vie with one another for the leading position in linseed production. The world production of linseed is a little more than 3 million tons of which U.S.A. raises 25 p.c., Argentina 20 p.c. and India 16 per cent. It is interesting to note that as late as 1967, about 60 per cent of the entire quantity of linseed that entered into foreign trade came from Argentina. Today, the leading exporters of linseed are Argentina, Netherlands, U.S.A., Uruguay, Canada and Belgium. So far as world trade is concerned, the linseed production of the U.S.S.R. is of no importance as it is entirely absorbed by the internal market. The principal countries importing linseed are West Germany, France, Netherlands, Belgium, U.K. and Denmark.

LINSEED PRODUCTION

(In '000 tons)

	1954	1961	1968	1969
Argentina ...	*414*	*818*	*580*	*520*
India	394	462	398	352
U.S.A.	1,037	555	693	926
Canada	285	364	461	781
World Total ...	2,690	3,000	3,146	3,532

[21] Linseed originated in Central Asia and was first cultivated for its fibre. It was introduced into Argentina in the second half of the 19th century.

The recent features of the international trade in linseed are the increasing importance of Indian linseed in the United Kingdom and the heavy importations of Argentine and Indian linseed into the U.S.A. to meet an expanding demand.

Sesame is an annual plant thriving in the tropical and sub-tropical parts of the world. Of the production of about 1·6 million tons, India raises one-third, Mexico 15 to 20 p.c. and Sudan 15 p.c. Burma, and Turkey are the other producers. The leading exporters of sesame seed in order of importance are Sudan, Nigeria, Ethiopia, China (Mainland), Cambodia and Thailand. About 70 p.c. of exports comes from Africa. The leading importers are Japan, Italy and U.S.A.

Castor plant is cultivated in India, Brazil, Java, Indo-China and Manchuria. The oil is extracted from the bean and is very useful for medicinal purposes and soap-making and also as a lubricant. Ecuador, Paraguay, Thailand and China (mainland) are the main exporters of castor-oil seeds. The exports of castor seed for oil go to France, Germany and Japan. The world production is a little more than half a million tons.

Soya bean grows on soils where cotton and maize are cultivated. Generally it grows best on rich loamy soils. It is sown in summer and harvesting begins from December.

As late as 1938, more than 50 p.c. of the world's total supply of soya beans in a year used to come from Manchukuo which was called the "Soya beans Empire of the world". After 1941, the production of soya beans continued to increase very much in the U.S.A., as a result of the oil shortage of the 1940's. American production ranks first in the world and fourth in all U.S.A. farm production. The Soya bean production in the U.S.A. in 1969 was 30 million metric tons compared to 5 million tons in 1948-52. China (mainland) raised in 1969 about 11 million metric tons of soya beans as against 9 million tons in 1948-52. The U.S.A. today accounts for more than 60 p.c of the world's total.

The principal soya bean producing areas are the U.S.A. China, and Indonesia. Other producers are Japan, Brazil and Korea. The world production of soya beans in 1969 was 45 million metric tons of which U.S.A. produced 30 million tons.

The U.S.A. handles about 70 per cent of the world's export in soya beans. The other exporters are Canada, Brazil and West

Germany. The leading importers of soya beans are France, East Germany, Japan, Canada, and U.K.

The world is becoming increasingly dependent on North America, for its essential supplies of edible oils and oilseeds. Without doubt, the ample supplies of soyabean oil has prevented the world from being short of supplies in vegetable oil. Farmers in the U.S.A. are growing less corn and wheat and more of soyabeans.

QUESTIONS

1. Account for the presence of different types of agriculture in the world. Describe the factors that lead to commercial farming.

2. Is degree of self-sufficiency in food grains related to the size of a country or its population ? What measures would you suggest to remove imbalance between food production and population growth ?

3. What conditions are ideal for rice cultivation ? Give a geographical account of rice cultivation in the world. —(Delhi, B.Com., 1969).

4. Discuss the geographical and economic conditions that promote the production and trade of wheat and cotton. —(Delhi, B.Com., 1963).

5. Give an account of the world distribution of rice and wheat and indicate in this connection the geographical factors leading to the successful cultivation of these crops.
—(Cal. I.A. 1951 ; Punjab B.Com. 1957).

6. What are the climatic and soil conditions necessary for the successful growth of (*a*) coffee and (*b*) beet ? Name the principal producers of these products. —(Indian Institute of Bankers, 1969).

7. Give a brief account of the international trade in wheat. What is the effect of harvesting season in different parts of the world on this trade? —(Delhi B.Com. 1955)

8. What climatic and physical conditions are necessary for the production of sugar cane and sugar beet ? In what parts are these chiefly produced ? —(Cal. I.Com. 1956).

9. Name the principal rubber producing countries of the world. Do you think synthetic rubber can compete with natural rubber ?
—(Cal. B.Com. 1951 ; Delhi B.Com. 1953).

10. Describe the geographical conditions necessary for the successful cultivation of tea Discuss the supply and demand position of tea in the world today. —(Delhi U, B.A. Hons. 1951 ; P.U. B.Com. 1958).

11. What regions of the Asiatic monsoon lands have specialized in the cultivation of the tea plant and why ? Could it be grown profitably in other regions outside these monsoon lands ?
—(Agra B.Com. 1953).

12. Explain the conditions favourable for growing cotton. Write a geographical account of cotton cultivation in the world and discuss international trade in raw cotton. —(Delhi B.Com. 1968).

13. State the geographical and climatic conditions necessary for the successful cultivation of (*a*) rice and (*b*) tea. Name the principal producers and exporters. —(I.I.B. 1968)

14. What countries lead in the production of cotton ? Are geographical or economic factors more important in making cotton production so important in these countries ? —(Patna University, M.A. 1957)

15. Describe the geographical conditions necessary for the cultivation of cotton and rubber. Give an account of their world distribution and trade. —(Delhi B.Com. 1971)

16. With particular reference to the production of either coffee or rubber, examine the characteristics and problems of tropical plantation agriculture. —(Bihar M.A. 1957)

17. Why is there a geographical separation of the typical areas of wheat and rice? Describe the contrasting nature of farming methods of the two crops. —(Cal. B.Com. 1964)

18. Examine the geographical and economic factors which have favoured the location of plantation rubber. Discuss the future of plantation rubber in relation to synthetic rubber. —(Delhi B.Com. 1964)

19. What do you understand by *irrigation farming* ? (I. I. B. 1967)

20. What are the soil and climatic requirements suitable for the growth of (*i*) Sugar cane and (*ii*) Coffee ? Name the principal producers of these products. —(I. I. B. 1971)

21. Describe the conditions that favour the cultivation of rice. Discuss the pattern of world production and trade in rice.
—(Delhi B.Com. 1971)

CHAPTER IV

WORLD'S MINERAL RESOURCES[1]

General Consideration

During the last 150 years changes with far-reaching consequences have taken place in the use of minerals by mankind. The development of fundamental science, engineering and technology has made it possible to extract and use a great variety of minerals in increasing proportions. Modern civilisation is, in many respects, dependent on mineral products. Machines, ships, armaments, buildings, coins, nay, everything connected with modern civilised life is more or less associated with minerals. But no nation has within its borders all the various minerals required by its industries. Hence all are bound together by a chain of economic dependence on one another in respect of various minerals. Some 70 to 80 minerals are known to enter into international trade. In the case of tin, tungsten, chrome, nickel, petroleum etc., the sources are few from which supplies must be obtained by all. In the case of some others, the sources are many, and therefore it is comparatively easy to get them from several alternative suppliers. No part of the world can be inaccessible to the seekers of minerals.

Mining has already become the world's second largest industry, next to agriculture. Unlike agricultural crops, however, mineral products are fixed in quantity; they cannot be increased or replaced. Once the minerals are extracted from the earth, they are gone for ever. From a practical viewpoint, therefore, mineral deposits are exhaustible. In fact, minerals are decreasing rapidly and, in future, civilisation may be threatened by their shortage unless it is counteracted by new discoveries and use of substitutes.[2] Already shortage in mineral resources is being felt in the Western Hemisphere, chiefly in the countries

[1] Source of statistics: Statistical Year Book (1970), United Nations, 1971; Year Book of International Trade Statistics, United Nations, 1970.

[2] Many agreements and understandings in the international arena are motivated by the assurance of access to mineral supplies.

round the North Atlantic border. So much of minerals, in particular basic metals, has been used up that the situation could have become almost critical in respect of tin, lead and zinc had it not been for the fact that many economic factors do not warrant heavy demand for them always. The deposits of copper, nickel, manganese, wolfram and antimony are also diminishing and new discovery is hardly keeping pace with demand. The outlook, however, for Eastern countries is less grave because the mineral wealth is yet to be tapped here in many regions. But in the near future there will be demand in the Eastern countries for metals in unprecedented quantities from the industrially developed countries as well as from many Eastern nations which have development plans for industrialisation, agricultural development, mechanised transport and hydro-electric schemes all of which bring about a revolutionary rise in the demand for metals and other minerals of the East. As it is, there is already inter-dependence to a large extent between Eastern and Western hemispheres, in respect of many minerals. For tin, chromium, cobalt, manganese and industrial diamond, the Western hemisphere depends on the Eastern hemisphere to the extent of 85 p.c. of the needs. Similarly, Eastern hemisphere obtains 85 p.c. of their requirements for nickel, molybdenum, sulphur and vanadium from the Western hemisphere.

The fact that some minerals are irreplaceable and still indispensable in the modern age has made nations alert to the need of conservation measures and management. However, it is difficult to get accurate and adequate estimates of mineral reserves as some countries conceal their data for strategic reasons.

Like agricultural industry, the climatic conditions can have their impact on the actual raisings of certain minerals. The annual production of a country is the sum total of the monthly production. The monthly production however varies because of the difficulties of operations on account of climatic conditions of the regions where the mining is carried on. Thus in India, the production of iron ore is the lowest in June, July and August because of heavy rainfall in areas where iron ore is mined. In Canada, the production of iron ore is the lowest in January and February because of snow in some mining

areas. Unlike agriculture, however, the production can be raised in months where operations are not disturbed by the climatic conditions.

Classification of Minerals[3]

(*a*) *Metallic minerals :*

Iron, copper, lead, tin, zinc, aluminium, silver, gold, mercury, antimony, platinum, manganese, nickel, chromium, molybdenum, cobalt, tungsten, vanadium, uranium and titanium.

Metals cannot be easily extracted for human use without reasonable expenses and effort. The scope for conservation, however, lies in the fact that some metals are recoverable for secondary use. Iron used in construction, transportation and tools is *recoverable,* but not so in paints and chemicals. Gold used in coinage, jewellery and objects of art can be recovered, but it becomes irrecoverable—relatively or wholly—when used in drugs, paints, stained glass and dentistry.

(*b*) *Mineral fuels :*

Coal, petroleum and natural gas. These three minerals are also known as *fossil* fuels. In spite of all the potentialities of atomic energy, the demand for mineral fuels will continue to increase as long as they last.

(*c*) *Non-metallic :*

These minerals are used for structural purposes, chemicals and various industries. The more common non-metallic minerals are asbestos, mica, graphite, fluorspar, sulphur, diamonds, phosphate rocks, gypsum and potash.

Metallic Ores and their Distribution

Gold :— Gold is a heavy, yellow metal known since the pre-historic times, and has played an important role in exploration, conquest, commerce, science and many of man's other

[3] Some of the minerals like iron, manganese, chromium, tungsten, copper, lead and sulphur are called "strategic" because they are necessary for national defence. Coal, iron ore and copper are spoken of as *basic* and all others contributory in terms of industrial economy.

civilizing activities. Gold's power in motivating exploration and settlement can be noticed from the development of California, Western Australia, South Africa, Alaska and New Guinea. Scarcity, beauty, resistance to corrosion and other distinctive characteristics have made gold a standard of value throughout the world. Only a few years ago, gold coins were widely used in many countries. No gold coins are minted now, although large reserves are kept for international payments. Quite a heavy demand for gold is for jewellery and other luxury articles, dentistry, electronics and medicine.[4] Gold's role as international money is still of great importance, but the supply is inadequate to allow it wider monetary role. Because of non-monetary demand for gold as well as of hoarding, it has always been difficult to maintain an international exchange rate of gold. Even when there are restrictions on dealings in non-monetary gold, large scale sales of manufactured and semi-manufactured gold in many countries lead to a great variation from the fixed rate of gold. The gold production in the world in 1969 was 1.2 m Kg.

WORLD GOLD PRODUCTION

(000 Kilograms)

Country		1953	1968	1969
South Africa	...	371	967	969
Canada	...	126	84	76
U.S.A.	...	61	48	53
Australia	...	33	24	22
Ghana	...	23	23	22
Philippines	...	15	16	18
Japan	...	8	19	21
Colombia	...	14	7	7
India	...	7	4	3
World	...	751	1,260	1,240

[4] Japan is the only country that uses less gold on jewellery and more on industrial applications. In U.S.A., however, the jewellery market has grown from needing 3.5 m ozs in 1962 to requiring about 8m ozs in 1970.

Gold is widely distributed throughout the world, but a few countries produce it in great bulk.[5] The leading gold producing countries are the U.S.A., South Africa, Soviet Union, Canada, Australia and Mexico.

More than 70 p.c. of the total production of gold in the world comes from South Africa, which is undoubtedly the greatest producer in the world. The development of South Africa mainly proceeds from the discovery of its gold-fields. The construction of the lines of communication and the planning of many towns and cities have been aimed at the exploita-

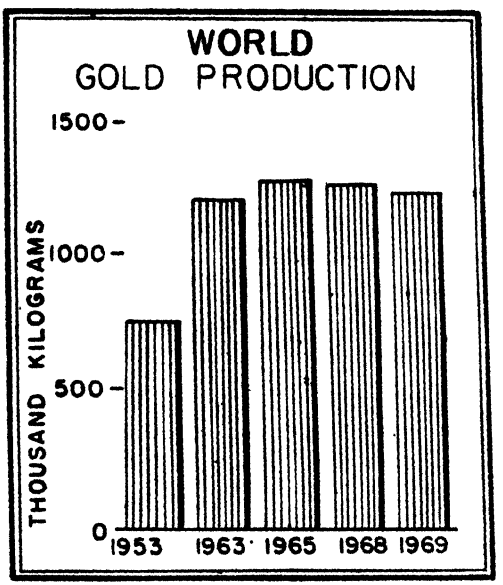


FIG. No. 23 World Gold Production

tion of this product. It is, therefore, said that "Gold mines are the backbone of South Africa". The region in which it is mined is the ridge of the northern rim of the hills that separate the basins of the Orange and Limpopo. This ridge is called the *Witwatersrand* (or simply Rand). The Rand goldfields were discovered in 1885. Both in total output to date and in current

[5] It is interesting to note that earlier producers of gold like Egypt, Asia Minor, Transylvania, Iberian Peninsula, Greece, Arabia and India have completely lost their importance because of the rise of the modern producers or the extinction of the product in their own lands.

output, the Rand is the world's leading gold centre. Gold occurs in conglomerate beds in the pre-Cambrian Rand formation of conformable sediments that rest unconformably on granite and schists. Although the sediments are found for about 150 km west and east, the mines are in an area of only 75 km long 40 km wide.[6]

The Rand industrial zone of S. Africa mainly depends on gold. The largest Rand towns are Johannesburg, Germiston, Benoni, Booksburg and Krugersdrop. All these towns are connected by railways and are situated within 100 km of Johannesburg, east and west. Nearly one-sixth of the Europeans of the Union or one-half of those of the Transvaal have settled in the "City of the Rand".

To the west of Johannesburg, gold is found in the rocks of the ridge. The rocks have to be crushed to obtain the gold. The gold mines are worked there with considerable difficulty, for skilled labour is scarce, transportation facilities are inadequate and the climate in the mining districts is not hospitable. At present a large number of labourers from India and China work in the mines. In South Africa, about 70 p.c. of the gold comes from Transvaal. The Cape of Good Hope, Natal and Orange Free State are the other areas.

Some gold mines in South Africa have abandoned operations because of low output and higher cost of raising; many ailing mines are receiving financial aid from the Government. In view of the fact that the price of gold in the international free market has gone up, many marginal mines will come into full operation with Government grants. To qualify for aid, a mine must have significant ore reserves. Such a scheme of aid helps a gold mine to tide over the difficulties till there is a general increase in the price of gold. If increased revenue arising from the sales of gold on the free market should reduce the need for any assistance to any mine, the scheme ensures that such assistance is automatically adjusted to the changed circumstances.

In Congo (Leopoldville) the bulk of the production comes from the Kilomotor mines. It has large reserves of gold.

[6] Some of the mines in the Rand are more than 9,500 feet deep and require cooling arrangements on account of excessive heat at depth.

Gold Deposits in North America

Gold is found in many parts of North America. The whole region from Alaska in the far north to Mexico in the south is rich in gold. The chief gold areas of North America are the Yukon basin of Alaska (the centre is Klondike), British Columbia (the Fraser and Columbia basins), California, the plateau of Idaho, the Eastern Rocky field (the Montana and Dakota), the plateaux of Colorado and Arizona and Eloro in Mexico.

More than 16 p.c. of the world's gold supply is raised in North America. Recently a few gold fields have been discovered in Ontario in Canada and there are still many to be discovered. The annual production of gold in Canada is about 148,000 kg. The most important gold producing districts in the U.S.A. are the Black Hills district, South Dakota ; Mother Lode and Grass Valley in California ; cripple Creek in Colorado and Nome in Alaska.

Gold is the most important mineral product of Australia where it is found practically in all the States. In Australia gold discoveries were made in 1851. This led to an amazing influx of migrants. From 400,000 population in 1850, the figure rose to 10,00,000 by 1858. The richest deposits are, however, found in Western Australia, Queensland and Victoria. Ballarat and Bendigo are the two chief gold-producing districts of Victoria. In Queensland the chief mining centres are Charlestown and Mt. Morgan. Western Australia has rich supplies of gold in Coolgardie and Kalgoorlie. Australia raises about 33,000 kg. of gold a year.

In India the greater portion of the gold produced comes from the Kolar fields in Mysore. In 1969, the Kolar gold-fields raised about 3,405 kg. of gold. Small production is also obtained from the Bellara mine 90 km. west of Bangalore. Burma produces a small quantity of gold, mostly extracted from alluvial deposits.

Silver :– It was known and used by mankind beyond written history, as a medium of exchange and in the arts. It is found pure and also in combination with other metals, the chief of which are gold, lead and copper. Nowadays most of

the silver produced is a by-product of some other metals, and therefore, its output is an index of the mining of those metals. Silver has much wider industrial use than gold and is actually in circulation as coinage in many countries. It is almost indispensable in the photographic industry, as surgical material, in dentistry, in electroplating industry, in electrical contacts and in plating of bearings of aeroplane engines.

WORLD SILVER PRODUCTION

(Metric tons)

Country		1953	1965	1969
Mexico	...	1,464	1,330	1,335
U.S.A.	...	1,169	1,093	1,234
Canada	..	725	928	1,304
Australia	..	390	611	777
Peru	..	556	1,095	1,074
Japan	...	249	473	868
West Germany	...	194	373	842
World		6,000	7,300	8,800

Deposits in North America

North America produces more than two-thirds of the world production. The whole mountainous range of the west from the U.S.A. to Chile in South America is rich in silver. Mexico is the leading producer of silver and she mines perhaps one-third of all the world's output of silver. Most of the silver mines are in Pachuca in the State of Hidalgo although the State of Chihuahua also raises a considerable quantity. The prosperity of Mexico depends mainly on the production of silver and its price in the international market. In the U.S.A. silver mines are worked in Idaho, Montana, Nevada, Utah, Texas, Colorado and Arizona. Canada is the fourth greatest producer. More than half of the silver produced in Canada is obtained from Ontario, and the rest from British Columbia. In the Andes of South America, extending from Peru to Argentina there is a belt of rich deposits of silver. In Peru the silver deposits are found along with lead and copper ores in the mines of Cerro de Pasco. In Peru the working of mines frequently suffered

in the past from political disturbances. With the restoration of stable government, production has increased considerably

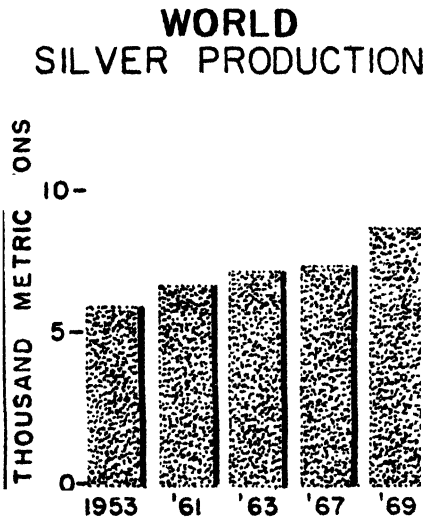


FIG. No. 24. World Silver Production

in that country and in 1967, its silver production was a little less than that of Mexico.

Silver Deposits in Other Areas

In Europe, the leading producers are W. Germany, Yugoslavia, Sweden, Spain, Italy, France and Finland. All these countries together raise about 900 metric tons of silver of which West Germany alone accounts for 60 p.c.

Australia is very rich in silver; large deposits are found in New South Wales and Western Australia.

Japan and India are also producers of silver. In India there are no silver mines; it can only be found as a by-product in the mining of gold, lead, tin, etc. Almost the entire silver supply of India used to come from the Kolar gold-fields of Mysore till 1954.

Since then, the lead and zinc ores of Zawar mines in Rajasthan is being smelted for silver as a result of which the

silver production has gone up. The production of silver in India in 1969 was only 2.9 metric tons, of which Rajasthan contributed 30 per cent.

Since production of silver is mostly concentrated in North America and Latin America, the prominent part in financing the production was taken by the U.S.A. In certain cases like Mexico and Canada, both British and American capital took part in the development.

Both gold and silver are subject to erratic, speculative fluctuations. Silver is no longer a monetary metal, but its industrial demand is much in excess of the production. The monetary role of gold is on the decline. Ten years ago, monetary reserve accounted for two-thirds of the gold. Today it is far less than half. Also, the increasing industrial demand for gold in the West and the hoarding habits in the East keep the price of gold speculative in the world markets.

Platinum :—It is a valuable metal used in photography chemicals, dentistry, in the electrical and jewellery business and in X-ray work. It is also used in the manufacture of handbags, cigarette cases, pocket lighters and knives. During recent years its use in the setting of diamonds has increased considerably. Russia has long been the chief producer, and though recently surpassed in production by Canada, it still has a reserve of many million ounces. The estimated world platinum metal production is about 650,000 troy ounces.

The U.S.S.R. contributes more than one-fifth of the world production. Russian deposits are found only in the Urals. Canada is a large producer and its production of platinum is about 95,000 troy ounces a year. Most of the Canadian output is raised in the Sadbury district of Ontario. The production is controlled chiefly by American and British capital. In South Africa, the principal deposits are in the Waterberg, Lydenberg and Rustenburg districts of the Transvaal. The U.S.A. and Australia also produce platinum.

Osmium and iridium are metals akin to platinum. These are produced mainly in Canada.

Lead :—It is one of the heaviest and softest metals in the world. Its use was known as early as 7000 to 5000 B.C. when

he Egyptians used it for glazing pottery. It is very commonly ound in association with zinc or silver, and is used for a variety of purposes in industries. It has served mankind as metal in mmunition, bearings, alloys in brass and bronze, storage atteries, pipes, cable covering, type metal, pigments and other hemicals. After the Second World War, the consumption of ead for batteries has expanded tremendously. Cable sheathing s another important use of lead in Europe and U.S.A. Of late, lemand for lead sheet has increased in U.K. for building. A new se of lead sheet is for sound insulation. Perhaps the greatest lifficulty in regard to conservation of lead ore lies in the fact hat it can hardly be recovered, once put to use.[7]

Geographical Distribution

U.S.S.R. has occupied the first position among the lead re producing countries in the world since 1966. Her production has gone up from 183,000 metric tons in 1953 to about 100,000 metric tons in 1970. Azerbaijan is an important lead ne producer. In Australia which is the second leading producer of lead ore in the world, the important mines are located in the Broken Hill district. As no coal is available in the neighbourhood of the lead ore areas, the ores taken by rail to Port Pirie at the head of Spencer Gulf. Australia contributes about 10 to 12 p.c. of the total lead ore production of the world in a year. The second leading producer is the U.S.A. where it is found in Missouri, Idaho, Oklahama, Colorado, Montana, Neveda, Utah, New Orleans and New Mexico. In spite of the fact that production in the U.S.A. is quite large, her domestic requirements are so great that supplies are often drawn from other producing countries, *e.g.*, Mexico, Canada, Spain and Australia. The U.S.A. normally consumes about 35 per cent of the production of lead against her production to the extent of 30 per cent of the world's total. Missouri is the greatest silver producing district in the world, supplying lead to the extent of 200,000 tons

[7] There is a strong movement in the U.S.A. to prevent air pollution which may result in the removal of lead from petrol where lead accounts for 20 p.c. of the total consumption. If such a move becomes world-wide, it will hit both the output and price of lead in the world in the near future.

a year. The Northern Idaho is the second largest silver-producing district in the U.S.A.

LEAD ORE: PRODUCTION (metal contained in the ore raised)

('000 metric tons)

		1956	1962	1967	1970
Australia	...	304	376	381	466
Canada	...	171	192	308	362
Mexico	...	197	193	168	168
Peru	...	129	187	158	—
U.S.A.	...	320	215	288	538
U.S.S.R.	...	320	350	400	400
WORLD TOTAL	...	1,940	2,041	2,950	3,280

In Mexico, lead ores occur in the States of Chihuahua, Zacatecas and San Luis Potosi. Australia which has become recently an important lead producer has deposits in New South Wales. Western Germany is the leading producer of lead in Europe. The other areas in Europe are the Island of Sardinia (Italy), the Lenares-Carolina (Spain) and the Trepea and Stantig (Yugoslavia). Nearly three-quarters of the output of primary lead are melted in five countries: the United States, Mexico, Australia, Canada and Germany (West).

Manganese Ore :—It is a metallic element widely distributed in nature as an oxide, carbonate or silicate. Its importance was first realised in 1856 when Bessemer used it as an addition to steel. Since, then, this practice has remained universal, and every ton of steel requires 14 lbs. of manganese. Manganese is used in the form of manganese iron carbide in order to remove sulphur and other impurities of iron. Since manganese is used predominantly in the production of steel, consumption moves closely with world steel output. Special steels with a high manganese content have exceptional hardness and are used in mining equipment and railway points. The other uses of manganese are in the manufacture of block enamel, in the chemical industry for the manufacture of bleaching powder and in electrical and glass industries. About 95 p.c. of manga-

nese is consumed in the metallurgical, and 5 p.c. in the chemical industries.

U.S.S.R., India, South Africa, Brazil, Ghana and China are the chief producers of manganese. Manganese is also raised in Japan, Turkey, Morocco and Congo.

MANGANESE ORE PRODUCTION

(thousand metric tons)

Country		1953	1968	1969
South Africa	...	333	936	1,044
U.S.S.R.	...	—	2,378	2,386
Brazil	...	102	923	—
Ghana	...	361	198	160
India	...	894	622	575
WORLD	...	4,300	7,100	7,300

The world production of manganese in 1970 was about 7.4 million tons of which U.S.S.R. alone raised 3.5 million tons, and South Africa about 1 million ton. Because of the increasing demand, the production of manganese has also gone up.

For every ton of steel produced, 13 to 15 lbs. of manganese are required and it happens that the world's important sources of high-grade manganese ore, with the exception of Russia, are not located in those countries which are the chief steel producers. About 60 per cent of world's steel comes from U.S.A., U.K., Germany, France, Sweden and Japan. With the exception of Japan and U.S.A. which between themselves produce less than one per cent of the world production, not one of them has within its boundary any manganese deposits. Consequently in such countries, manganese is considered a strategic mineral, and large stocks are always kept in case of emergency.

U.S.S.R. is the largest producer of manganese with a little less than 50 p.c. of the world's total. The two important manganese-producing areas in U.S.S.R. are the Georgian Republic and the Ukraine. In Georgia the deposits are located at Chiatura in the province of Kutais. The Ukraine supplies manganese from Nikopol to the north of the Black Sea. In the Soviet Union, over 80 per cent of the manganese ore production is

from the Nikopol and Chiatura districts. Manganese ore is also found in the Urals in Kazakstan and Siberia. A very considerable tonnage of her ore is used for the domestic iron and steel industry. India has deposits in Madras, M.P., Bihar, Orissa,

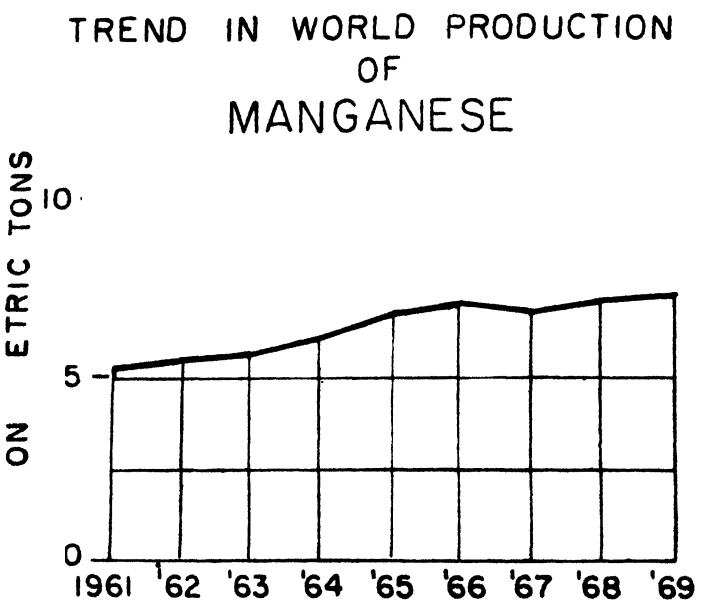


FIG. NO. 25 Trend in World Production of Manganese

Maharashtra and Mysore. Most of the Indian ores are hard lump ores very suitable for metallurgical purposes. India is the leading supplier of managese ore to U.S.A. and U.K. Ghana which is showing a declining tendency in manganese production will have progress in the output of manganese with the improvement of transport and labour conditions. Brazil has many manganese deposits, but the major production comes from the Lafayette district in Minas Geraes. The Brazilian ores are on the whole of lower grade than Indian ores.

South Africa is the second largest manganese producer in the world. South African deposits are near Postmasburg in Griqualand West, a part of Cape Province and are under the

disadvantage of being far off from the sea-board. The production, however, is on the increase.

Unlike most metals, a very large proportion of manganese required in metallurgy is entirely lost once it is used; only a negligible amount can be recovered as a secondary metal.

Trade in Manganese

U.S.S.R. is a substantial net exporter of manganese. Except Japan, all leading industrial countries depend more or less on imports. Conversely, all principal manganese producing countries export all or much of their output. Only Brazil and India retain a considerable portion for domestic use. The biggest market for manganese is the U.S.A. which takes about 50 p.c. of the world's total. Brazil, Ghana, South Africa and India compete with one another for U.S.A. market. Brazil has the advantage of being near to the U S.A. and therefore of reduced freight rates. The difficulties of Indian manganese in respect of foreign market are the high cost of production, resulting from high royalty rates.

The great bulk of manganese which is exported enters the world markets in the form of ore. This ore is subsequently converted into ferro-manganese by the importing countries. However, U.S.S.R. exports manganese in ferro-alloy form to countries in Europe and Asia. There is no export of manganese from U.S.S.R. to U.S.A.

Manganese is not likely to be replaced by other materials in any of its main uses in the immediate future. Its consumption is therefore to continue in line with steel production. Any increase in demand for manganese in future can be met from the existing manganese resource. This also means that any significant reduction in demand is bound to affect prices.

Zinc :—Zinc ore is generally associated with lead and copper ores. The use of zinc was known to men as early as 300 B.C.

Zinc is used widely because of its malleability, ductility, resistance to corrosion and adaptability to the manufacture of pigments, and for the fact that it is an important alloy. It is extensively used now for galvanising iron and steel products, die casting, brass making, rolled zinc and zinc oxide.

The major use of zinc throughout the world is in galvanising, and it is one that is growing in developing areas for coating steel sheets with zinc. Under-bodies of most cars in the U.S.A. use galvanised strip so that these cars can get extra-protection against corrosive action of salt and grit used to keep roads clear of snow. There is also demand for galvanised wires in connection with structural steel work in building, railway electrification and bridges. Of late zinc die castings have become very important in automobile industry. In Europe, the biggest use of zinc is in brass making. There is also extensive use of rolled zinc for roofing and roofing accessories in North-West Europe.

The world production of zinc ore in 1970 was about 6 million metric tons of which Canada raised about 20 p.c. U.S.S.R. is the second largest producer. Australia, U.S.A. and Peru are the other large producers

WORLD ZINC ORE PRODUCTION

(thousand metric tons)

Country	1953	1968	1969
Australia	243	422	507
Canada	365	1,155	1,194
Mexico	227	240	253
U.S.A.	497	480	502
U.S.S.R.	188	575	610
Peru	127	291	315
WORLD	2,760	5,070	5,410

Canada is the leading zinc producing country in the world and raises about 25 p.c. of the world's total. Its production has gone up to 1.2 million metric tons in 1969 from 383,000 tons in 1955. The U.S.A. contributes about 10 per cent of the world's supply. Oklahama, New Jersey, Kansas and the Utah are the principal sources of supply. U.S.S.R. is the second largest producer of zinc ore with about 12 p.c. of the world's total. As a result of some recent discoveries of zinc mines, Australia has become the fourth largest producer in recent years. Northern Rhodesia contains large deposits of zinc ore, though present production is no indication of its large reserves.

The principal exporters of zinc are Australia, Belgium and the Congo, Canada, Italy, Mexico, Norway, Peru, Spain and Sweden.

About 34 p.c. of the world's zinc reserves is in the control of U.S.A. capital. The zinc mines of Australia, Canada, and Africa which constitute about 26 p.c. of the world's zinc reserves are owned and controlled by British capital.

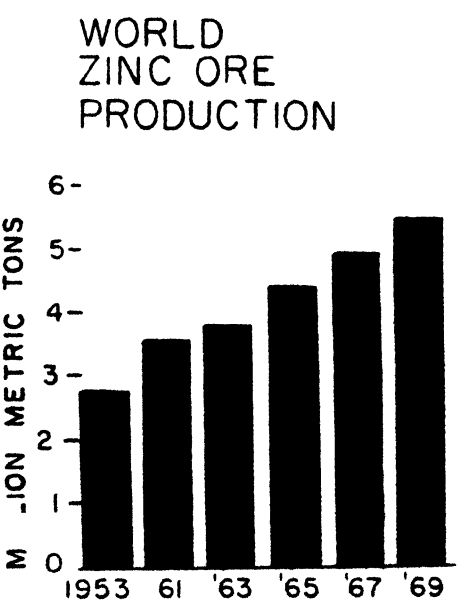


FIG. NO. 26 World Zinc Ore Production

Copper Ore :—It is one of the first metals known and used by men. Its great value is on account of its ability to conduct electricity and heat in adverse conditions with complete reliability, its great plasticity and its resistance to corrosion in connection with roofing, plumbing and heating services. The growth of copper output in the past and its present development are due to the fact that there is a combination of properties of the metal and of the wide range of copper alloys that are available in cast and wrought forms. Mixed with zinc, it produces brass; with tin, bronze; and with nickel,

German silver. In peacetime about 50 p.c. of the copper production is employed in the electrical industry for generators, motors, electric locomotives, switch boards, telephone and telegraph equipment, light and power lines etc. As yet, no universal substitute has been found for copper, though on a limited scale aluminium can be used as such.

The world production of copper ore in 1970 was a little more than 5 million tons. U.S.A. and U.S.S.R. raise a little less than 1 million ton each. Chile is becoming a near competitor of these two countries. There is a big expansion programme at Chile aimed at raising its output from 650,000 to over 1 million tons in the next few years. There are also big projects in New Guinea, Australia and Iran.

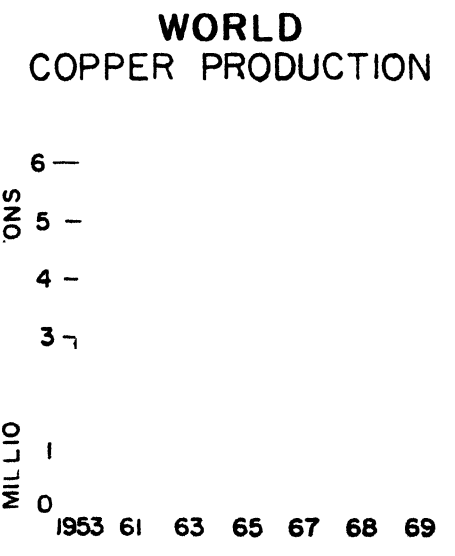


FIG. 27 World Copper Production

In the U.S.A. the copper ores are found in Montana, Arizona, Nevada, Colorado, Utah and Lake Superior Coast. The greatest copper-producing area in the world is the Butte district (Montana) in the U.S.A. The second largest copper-producing district in the U.S.A. is the Lake Superior district where the mines are located in the vicinity of Houghton. The

U.S.A. is the leading producer in the world and contributes more than 30 p.c. of the world's total.

Chile is a large producer of copper most of which is found in the south-eastern parts. The reserves of copper in Chile are vast and are estimated to contain about one-third of world's reserves. The important copper centres in Chile are Potreilios, and El Teniente. In Asia the position of Japan in respect of this metal is very enviable. Normally, Japan raises about 5 p.c. of the world's output of copper. Most of the copper mines of Japan are in Honshu. Osaka is the chief smelting and refining centre. India also produces a small quantity of copper.

The production of copper in Europe being insufficient for her requirements, import from overseas is of considerable magnitude. The principal copper-producing countries of Europe are Spain, Germany, Norway and Sweden.

The Commonwealth has increased her production enormously within recent years and her position in regard to reserves is about 27 p.c. of the world's total. Canada today ranks fifth in copper production. Rhodesia raises an appreciable quantity.

It has been estimated that at the present rate of consumption, the total copper reserves may be exhausted in fifty years. New reserves, however, may be discovered even in the older producting countries. Recent explorations have proved that the Katanga deposit in Congo is one of the richest in the world. What gold and diamonds have been to South Africa, copper promises to be for Congo. The difficulty of securing labour and the excessive cost of transportation tend to check rapid development. The other important producers are Mexico, Cuba, Iran and Peru.

WORLD COPPER ORE PRODUCTION

(thousand metric tons)

Country		1953	1963	1968	1969
U.S.A.	...	841	1,100	1,093	1,401
U.S.S.R.	...	305	600	850	900
Chile	...	361	602	667	669
Canada	...	230	410	575	506
Congo Dem. R.	...	214	271	321	357
WORLD	...	2,790	4,650	5,480	5,940

Normally, five countries account for 80 per cent of copper production: the United States, Chile, U.S.S.R., Zambia and Canada.

For technological reasons, there has been much increase of alternative materials as substitutes of copper, and this trend has reduced the growth rate of copper consumption in the developed countries.[8]

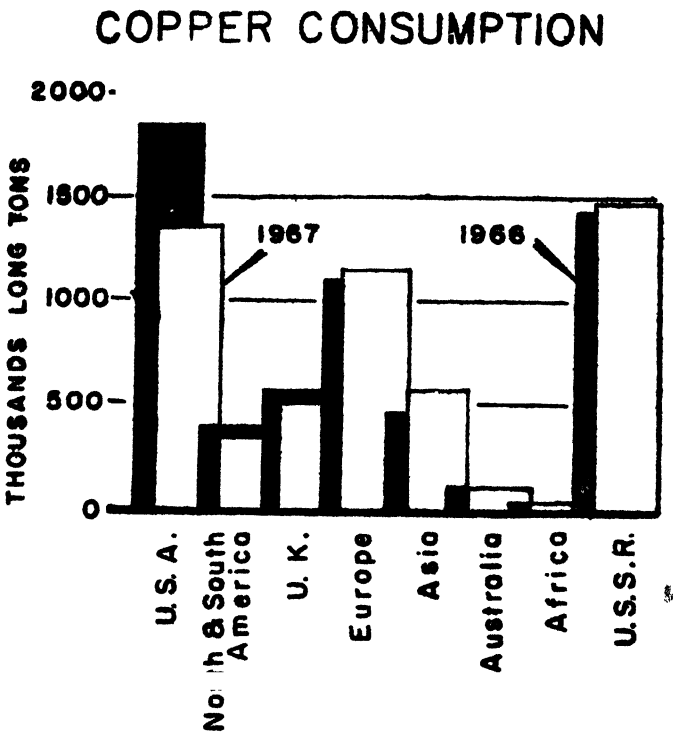


FIG. NO. 28 Copper Consumption—

U.S.A. is the largest consumer of copper, using as much as between 25 and 30 p.c. of the world's total. In 1969, it consumed 1.4 million long tons out of the world's total of 5

[8] In spite of the imbalance between production and consumption, the copper producers are in no mood to raise the prices lest there be exodus of copper consumers into substitute materials such as plastic and aluminium.

million tons. The larger demand for copper in U.S.A. is for defence purposes.

It was estimated that World demand for copper in 1971 would be to the extent of 7.5 million tons. The increased production from Soviet Union, Chile and Zambia created a surplus of over 250,000 tons and disturbed price levels.

Increased mechanisation in copper mining has brought about improvement in cost of recovery. Since percentage of copper in many ores is very low, concentration methods at the mines have become more common. Much additional copper is recovered from "trailing" and "stamp stands". The trailings are rock dumps containing copper bearing wastes, and the stamp stands consist of finer wastes from the mills where ore is crushed for concentration. Both these materials can yield significant quantity of copper.[9]

Aluminium :—It is the most abundant metallic element, estimated to form about 8 p.c. of the solid portion of the earth's crust. It has become very important in these days of aviation. Fifty years ago, its importance was practically nil. It is also used in motor cars, railway carriages, electrical and armament industries.

Aluminium is extracted from bauxite and cryolite. Jamaica, France, Dutch Guiana, Ghana, British Guiana, Hungary, Australia and the U.S.A. produce bauxite.[10] Cryolite is found only in Greenland. Though the Government of Greenland restricts the production of cryolite according to budget requirements, it has never shown the least sign of differentiating between foreign customers. Cheap power is necessary for smelting aluminium ore.

The world production of bauxite in 1970 was 50 million metric tons, of which Jamaica alone contributed about 9 million tons. Since 1952, when Jamaica raised only 420,000 metric tons, the production in that country has been on the increase.

[9] Future application of copper will follow current lines, but with a tendency to use significantly less copper for the same purpose through improvements in designs of equipment.

[10] The discovery of massive bauxite deposits in the far north of Queensland in Australia in 1955 has made Australia a major world force in the aluminium industry. The current production is 2 million tons a year but is expected to rise to 8 million tons by 1972.

Surinam, the second leading producer, raised a little more than 5 million metric tons in 1969, followed by U.S.S.R. with 5 million tons.

The United States with a production of 2 million tons of bauxite has become the largest producer of aluminium and aluminium products in the world. It raises only 15 per cent of the world's total output of the aluminium ore, but is responsible for more than 60 p.c. aluminium production of the world. The U.S.A. imports about 74 p.c. of the requirement of bauxite from Jamaica and Surinam.[11]

Canada has an annual production of half a million tons of aluminium. The Canadian output can be further increased. A huge new plant has been erected in British Columbia for aluminium production. The U.K. aluminium production is relatively small, about 30,000 tons a year, and is operating at capacity. Britain depends mainly on Canada for this metal. Canada is one of the largest exporters of aluminium, sends more than 400 metric tons of unwrought aluminium, or about 85 per cent of its production. Of these exports, 48 per cent go to the United States and 41 per cent to the United Kingdom. U.S.S.R.'s production of bauxite was 5 million tons in 1967, and her aluminium production in the same year was 1.3 million tons.

The modern method of extraction has greatly increased the output of this metal, and consequently prices have been reduced. As a metal it is light, tough and non-corrosive. Aluminium can be easily manufactured where power is cheap. In France, Germany, Norway and Italy it is worked very advantageously because water-power is available at a low cost.

Increases in production facilities are projected in Australia, India and Norway. The possibility of developing aluminium production in North Borneo and Ghana is also being investigated.

The output of aluminium metal so far has been largely confined to the developed countries because the large scale reduction of alumina to aluminium requires an abundant supply of cheap electric power. The production of bauxite in the developed-market countries in 1969 was about 9 million tons.

[11] Since 1970, the demand for aluminium is on the decline in the U.S.A. Infact, the U.S.A. is turning from a net importer to a net exporter of aluminium.

The broad pattern of trade is the export of bauxite and alumina from the developing countries to developed-market countries. The pattern is to continue for long. The world aluminium industry is largely in the hands of six international companies because the process of making aluminium has led to this concentration. Bauxite ore and cheap power, so necessary for smelting are not found together. The developing countries are, therefore, anxious to do the processing within their countries.

Tin :—This soft crystalline metal is preferred to other materials for many uses due to its combination of properties which lead to low fusibility, malleability, resistance to corrosion and ability to alloy with other metals. The metal is useful in manufacturing packing cases, tin roofing and many other articles. The most important single use of tin is for plating iron. The ability of tin to resist corrosion and its affinity to steel surfaces when molten have contributed to the development of tin-plate, which today consumes about one-third of tin production. Tin has considerable demand in fish and meat-packing centres. The principal countries noted for tin production are Malaysia, Bolivia, Indonesia, China, Nigeria and Congo. The other producers are Burma, U.K., South Africa, Portugal, Japan and Brazil. The U.S.A. raises an insignificant quantity of tin, ranging from 5 tons to 200 tons a year, and most of the deposits are either uneconomic in size or in grade.

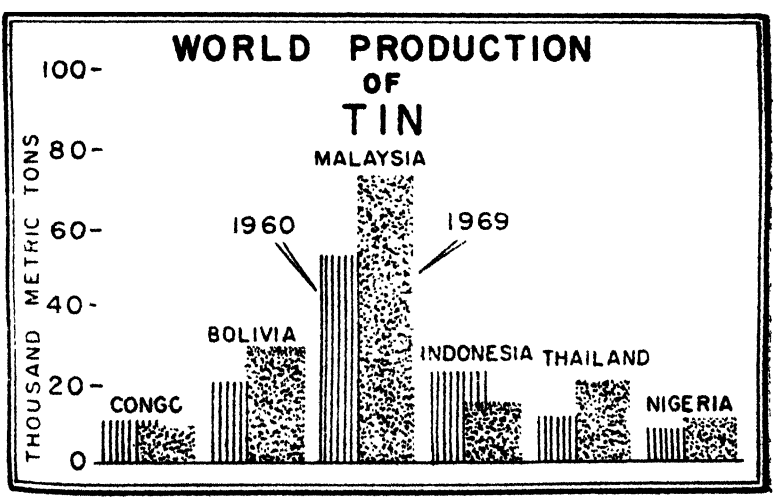


FIG. No. 29 World Production of Tin.

In Malaysia, the deposits have been worked at Perak, Selangor, Pahang and Negri Sembilan, the first two furnishing 90 per cent, of the total. Small deposits are also located in Johore, Kedah, Kelantan, Perlis, and Trengganu. Tin mining and smelting is Malaysia's premier industry. About 70 p.c. of the tin production of Malaysia comes from European-owned mines and 30 p.c. from Chinese-owned properties. The smelting of tin is the virtual monopoly of the British companies at Singapore and Penang. The British companies have not only monopolised the smelting of tin ore mined but they also treat large quantities of ore imported from Burma, Thailand, Indonesia, Japan, Australia and Africa. Export duties on tin from Malaysia are almost prohibitive except when these are meant for U.K. or Australia. This imposition of duties has led to the domination of world's tin smelting industry by the British. The tin-deposits of Indonesia are of considerable importance. Most of the deposits are in Banka, Sumatra, Singkep and Billiton. From 46,000 tons in 1948, Malaysia increased her tin production to 73,000 tons in 1967.

About 70 per cent of the world's total tin supply is obtained from Malaysia, Indonesia, China and Thailand. In Bolivia the proper development of this metal is subject to many handicaps, specially the absence of communications. Most of the tin mines of Bolivia are found at altitudes above 12,000 feet. The Bolivian centres are Petosi and Oruro. Indonesia was the second largest producer of tin in 1948. Since then its production has declined considerably partly due to uncertain political conditions within the country and partly due to competition with other producers of South-East Asia. Her production of tin in 1970 was 15,000 tons.

TIN CONCENTRATES PRODUCTION

(metric tons)

Country		1953	1963	1968	1969
Bolivia	...	35,384	22,603	29,568	30,047
Thailand	...	10,228	15,835	23,980	21,092
Malaysia	...	57,309	60,909	76,274	73,325
Indonesia	...	34,365	13,155	16,899	16,542
WORLD	...	172,800	143,700	184,700	179,600

In 1970, the world production declined to 176,000 metric tons.

The world consumption of tin between 1952 and 1960 increased at a rate of 3.3 per cent a year. Since then, there has been a continuing displacement of tin by other materials in various end-uses. Consequently the growth demand is around 2 per cent. The supply-demand situation for tin has changed considerably between 1960 and 1967. Till 1966, tin was in short supply compared to demand. After 1967, the primary production of the metal increased, while consumption fell.

The greatest consumer of tin in the world is the U.S.A. where the meat-packing industry is practically dependent on the supply of tin imported from foreign countries.

The Five-year International Tin Agreement was entered into in 1966. It has for its objectives the making of arrangements which will help maintain and increase the export earnings of developing producing countries in particular, and the achievement of a remunerative return to producers which will help to secure an adequate supply at prices fair to consumers. One of the factors which is causing anxieties to the producers is the deep rise in the production cost. Now that West Germany and the Soviet Union—the two big consumers have joined the agreement in July 1971, the producers may be in a position to get reasonable price for their output.

Mercury or Quicksilver[12] **:—** It is the only metal that is liquid at ordinary temperatures, and is used in pharmaceuticals, industrial and control instruments, electrical apparatus and in many other ways. In fact, mercury is called the "metal of a thousand uses." "The poisonous quality of the metal and its compounds is responsible for their broad use in inhibiting bacterial and parasitic growth." It is also used in the manufacture of thermometers and barometers, in ointment, and the silvering of mirrors. Mercury is handled and shipped in metal flasks, a single container holding 76 pounds as a standard weight. The world production of mercury in 1970 was 9,000 metric tons, of which Spain produced 2,000 tons, Italy 1,657 tons and U.S.S.R. 1,550 tons. The other important producers are U.S.A., China (Mainland), Yugoslavia and Mexico.

[12] As a liquid, mercury is 13.6 times as heavy as water. It is the seventh in historical order of the metals known to the ancients and was very important in medieval alchemy.

Although mercury is found widely distributed throughout Italy, the principal deposits are in Tuscany, the Idria and Trieste. In Spain, the deposits are found in the Almaden mine in the province of Ciubad Real and in Granada and Oviedo. The chief States of the U.S.A. supplying mercury are, in order of importance, California, Oregan, Texas, Nevada, Washington and Arkansas. The annual production of mercury in the U.S.A. is only about 800 metric tons. In Russia, mercury is mined at Nikitova in the Donetz basin. There are a number of small mercury mines in Mexico, but the production is a little above 600 metric tons, because of labour troubles and lack of industrial equipment.

Iron[13] :— Iron is by far the most useful of all the metals. The success of almost every industrial enterprise depends upon the extensive and efficient use of machinery and other economic equipment made wholly or in part from iron and its alloys. Since leadership in industry and trade demands an abundant and efficient use of mechanical equipment, a plentiful supply of iron is always very helpful. Metallic iron is found in some chemical combinations mixed with a certain amount of earthy matter and occurring in deposits known as ore.[14] The operation of getting iron from the ore is known as smelting.

Economic Factors in Iron Ore Production

Whether or not an iron bearing rock is ore depends on many factors such as its demand reflected by the price of ore. As price goes up, many iron bearing rocks not considered iron ore now because of low quality or undesirable impurities or unfavourable geographical location, will be brought under new methods and techniques of mining operations for ore. "The rock of today is the ore of tomorrow." Thus, the value of an iron ore deposit depends not only upon its richness in iron, but also upon its location and the ease or difficulty of mining. Some of the richest iron ore deposits of the world are at pre-

[13] The first intensive production of iron started sometime in 1500 B.C. in Asia from where it spread to Mesopotamia, Palestine and Egypt. In India, the history of Iron Pillar at Delhi can be traced to 350 B.C.

[14] It is hardly found in metallic form but in some chemical combinations, such as (*i*) hematite, red or grey iron oxide, (*ii*) magnetite, black-magnetite iron oxide, (*iii*) siderite, iron carbonate and (*iv*) limonite, brown hydrous iron oxide.

sent of little economic value because of their remoteness from the great industrial centres and the resultant expense of transporting them to the places where they may be utilised. This is specially true of the great iron ore deposits of Southern Brazil which contains the largest reserves of iron ever discovered. Many impurities occur in combination with iron ore which are to be removed from the ore. Usually coke and limestone are mixed with iron ore and heated to a high temperature. Limestone absorbs the impurities of the ore.

Improving the grade of ore by crushing, washing and sizing, mechanical removal of rocks of varying sizes, magnetic separation of ore from impurities, mixing low and high grade ores and sintering to suitable physical character for blast furnaces are known as beneficiation practices.

Iron is obtained from the ore by the use of coal in the form of coke, and its mining is therefore very much confined to regions where these two minerals are found together. Eastern U.S.A. and Western Europe contain these two minerals in close proximity to each other. *These two regions therefore have the world's leadership in the manufacture of heavy iron and steel goods.*

Iron Producing Areas

Iron ore deposits are scattered all over the world, but the important ones are found in U.S.S.R., U.S.A., France, Canada and India.

IRON ORE PRODUCTION

(in thousand metric tons)

Country		1953	1968	1969
U.S.A.	...	60,179	50,172	52,513
U.S.S.R.	...	31,297	9,549	100,985
Australia	...	2,161	17,192	24,861
Canada	...	3,366	26,280	22,318
France	...	13,790	17,952	18,013
India	...	2,977	17,242	18,039
Sweden	...	10,176	20,299	20,691
Liberia	...	893	13,292	14,786
Venezuela	...	1,470	9,922	12,416
WORLD	...	158,600	370,700	390,400

With the exception of U.K., U.S.A., and West Germany, the iron ore production has increased substantially in most countries between 1958 and 1969. U.S.S.R., whose production was one-third of that of U.S.A. has now more production than the latter.

The **U.S.A.** raises nearly 15 p.c. of the total production of iron ore of the world. There are three principal belts in the U.S.A. producing iron ore—(*a*) the Mesabi range in Minnesota, (*b*) peninsular Michigan and (*c*) the Appalachians.

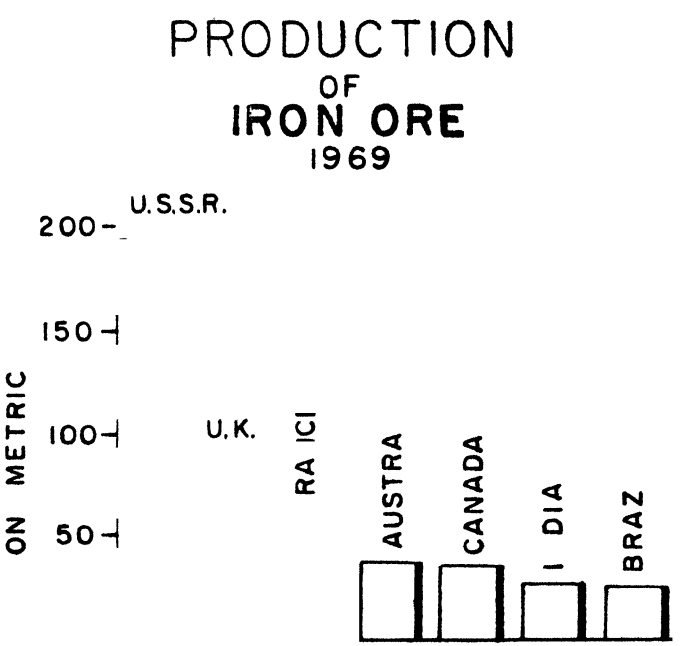


FIG. No. 30. Production of Iron Ore—1969

The Alabama district in the Appalachians, though it produces a large quantity, suffers from being situated at a great distance from the ports. From the point of production, Minnesota occupies the first place, followed, in order of importance, by Michigan, Alabama, New York, Utah, Texas, Georgia and Pennsylvania. Despite enormous deposits of iron ore within the country, the U.S.A. imports considerable quantities of iron

ore from Chile, Cuba, Sweden, Spain and Africa. Besides, her domestic supplies of iron ore have remained the same since 1948.

In the **United Kingdom** the bulk of iron-ore supply comes from Yorkshire, Lincolnshire, Northamptonshire, Cumberland and North Lancashire, which cannot provide the country with her requirements of ore. The ore averages in many cases 25 to 30 p.c. iron. The reserves of this ore are estimated at 3 billion tons. The country is becoming increasingly dependent upon imports. **France** obtains the bulk of her iron ore from the Lorraine fields, the richest area in iron ore in all Europe. Normandy and the Pyrenees are the two other areas of France noted for iron ore.

Norway has a considerable production of iron-ore in the north almost in the Arctic Circle. Large deposits are also available in Central and Southern Norway. In Sweden, the ores are not abundant, but they are noted for their highest quality and contain 65 per cent iron. In Sweden, valuable deposits are found at Kiruna and Gallivaru in the north and at Dennemora in the centre. The reserves at Kiruna are estimated at 1·5 billion tons and at Gallivaru at 200 million tons. Most of the ore is exported to West Germany and U.K. **Spain** is fortunate in having large deposits of iron ore. But the ore is little used in the country and is mostly sent to Germany and Britain.

Soviet Russia is the largest iron ore producing country in the world. The output of iron ore in the U.S.S.R., in 1969, was about 101 million tons out of world's total of 340 million tons. In fact, U.S.S.R. has been maintaining a high rate of growth since 1948 when her production was only 16 million tons. Recent surveys of iron resources have revealed new supplies in Soviet Russia; the Donetz basin and Tula are no longer the only suppliers. The principal iron ore regions are:

1. in the neighbourhood of Kursk;
2. near Orsk in the Southern Urals,
3. at Telbes in the Kuzmas region;
4. the Murmansk peninsula;

5. the Magnet mountain near Magnitogorsk in the Urals;
6. at Krivoi Rog in the Ukraine. This was the principal iron ore region before the Revolution.

Brazil has large deposits of higher grade iron ore which are worked in the districts of Minas Geraes and the Itabira. It is believed that Itabira has the richest iron ore deposits in the world. These deposits are however about 320 miles from the nearest ports of Victoria and Aracruz. Large reserves of iron ore also exist at Urucum (Meto Grosso), Cataloa (Goias) and Ipanema (Sao Paulo). The iron ore production in Brazil in 1969 was 22 million metric tons. Brazilian production will increase further with proper development of means of communication. Iron is mostly exported to Europe and U.S.A.

Asia has large deposits of iron ore although its development is confined to a few countries only at present. Japan has the most completely integrated iron and steel industry in Asia but her deposits of iron ore are not sufficient to meet the requirements of her steel industry. There are only two important fields—one at Senin on the coast of Honshu and the other at Muroran in Hokkaido. The annual production is about 1·2 million tons of iron ore. *India's* output of iron ore in in 1968 was about 16 million tons. In India the most important iron deposits are in Singbhum, Keonjhar, Bonai and Mayurbhanj in Orissa, where recent discoveries include what appears to be a range of iron ore running almost continuously for forty miles. The reserves of iron ore in India are estimated at 12 billion tons, most of which are of good grade.

Morocco, Algeria and Tunisia in Africa are likely to play significant role as suppliers of iron ore to Europe and U.S.A in the near future, partly because of their vastness of reserve and mainly because of Europe's increasing dependence on imported ore.

In Australia, iron ores are mined in South Australia, New South Wales, Queensland and Tasmania. North-western Australia has also good grade ore. The iron ore production in Australia in 1969 was more than 24 million metric tons.

Trade in Iron Ore

U.S.A., Western Europe and Japan are the three leading importers of iron ore. Their total volume of imported iron ore ranges from 80 to 90 million tons. Poland, Yugoslavia, Hungary, Italy and East Germany also import iron ore. The exporters are India, Spain, Algeria, France, Brazil and Sweden. Small quantities are also exported by Philippines, Malaysia and Australia. There was a ban on the export of iron ore by the Australian government till 1960 in the belief that the country's resources in this respect were limited. With the exploration of new fields, indicating reserves of more than 15,000 million tons, Australia has entered the world market as an exporter, and the chief buyer is Japan. The nearness of Australia to Japan has led the latter to long-term contracts to have this mineral from the former. This arrangement has affected the volume of India's export of iron ore to Japan which normally takes 50 p.c. of India's iron ore.

Although consumption and production of iron ore have grown at about a similar rate between 1960 and 1965, there are indications that supplies are in excess after 1968. The United States which was a large importer of iron ore in the recent past has revived her home output and she imports more from Canada than elsewhere. In 1970, U.S.A. imported about 27 million tons of iron ore. The production of iron ore is scattered over many underdeveloped countries in Latin America, North and West Africa and Asia. For most producers in Latin America iron ore is of secondary importance in export incomes. Similar considerations apply to India, Malaysia and Philippines. In West Africa, however, iron ore is of great importance as a source of income from export, particularly in Liberia, Sierra Leone and Mauritania.

According to a United Nations Study, the demand for iron ore is not likely to overtake production before 1980. "The present situation of the world market for iron ore is characterised by an excess of potential supply over demand and by relatively low price levels." There is an urgent need of an international policy to cope with potential surplus supplies. Also export potential in many markets is affected by the quality of ores, which require considerable treatment before

shipping. This means a substantial investment in new plants in developing areas.

Iron Reserves

The total iron ore reserves are estimated (1957) at about 60 billion tons which can be exploited economically. In addition, there are potential and marginal ores to the extent of 150 billion tons.

KNOWN IRON ORE RESERVES OF THE WORLD[15]

(Million long tons)

U.S.A.	10,450	Sweden	2,205
Germany	1,315	India	3,000
U.S.S.R.	2,057	Newfoundland ...	4,000
United Kingdom ...	5,970	Brazil	7,000
France	8,165	Cuba	3,159

Mineral Fuels and Water Power

The provision of energy to assist man in his work is an essential requirement for economic development. The resources for the development of power can be divided into two classes: (*a*) the irreplaceable (*b*) the replaceable. The solid and liquid fuels like coal and lignites, peat, petroleum, natural gas, shale oil and materials which provide nuclear power belong to the first category. Among the replaceable sources are wood, water power, tidal power, wind power, solar radiation. internal heat in the earth, etc. The conventional sources of energy today are coal, petroleum, natural gas and water.

The increased consumption of different types of energy in recent years, has brought about some changes in the proportionate importance of each.

In 1953, coal accounted for about 70 p.c. of the world's total consumption of energy resources. In 1967, coal's share was a little more than 48 p.c. In contrast, the share of liquid fuel has gone up to 36 p.c. in 1967 from 20 p.c. in 1953.

[15] Zimmerman: *World Resources and Industries* (1951).

Continued growth in energy requirements throughout the world in general and in Europe and the U.K. in particular would give rise eventually to problems of supply and that in these circumstances the position of the energy importing countries would become progressively weaker as the supplying countries inevitably increase prices both to take advantage of their competitive position and to meet the ever rising costs of developing less easily accessible reserves.

Coal :— The ancient Chinese people discovered the use of coal as far back as 3,000 years ago. In modern sense, coal brought about industrial revolution between 1765 and 1850 when steam-driven pump and locomotive engine were invented in England. Today, it is the greatest source of power for manufacturing, mining and transportation. Its by-products are equally important for industries. The principal by-products are tar, ammonia, gas, coke, crude oil, benzol, naphtha, sulphur, etc. The basic chemicals as well as coal tar medicines are coal derivatives. In addition, synthetic textiles, synthetic rubber, paints, plastics etc. need coal. No modern nation has become industrially great without access to ample supplies of coal, and the great industrial powers—U.S.A., U.S.S.R., Germany and U.K.—lead the world in the production of coal. There is a distinct correlation between the pattern of coal distribution and the industrial development of individual countries. The great industrial countries have large deposits of coal, and this pattern will continue till other sources of power take the place of coal.

COAL: PRODUCTION (Anthracite and bituminous)

(in million tons)

	1948	1960	1967	1969
Belgium ...	27	22	16	13
Germany (W) ...	87	143	112	112
India ...	31	52	68	75
Japan ...	34	51	47	45
Poland ...	70	104	124	135
U.S.S.R. ...	150	374	414	426
U.K. ...	213	196	175	153
U.S.A. ...	593	391	481	513
WORLD ...	1,406	1,988	1,919	2,063

The relative proportions of fixed carbon, moisture and volatile material decide the rank to which coal belongs. Broadly speaking, its rank is high when the moisture and volatile material are less. Thus from high to low, the rank of coal is as follows: (*a*) Anthracite, (*b*) Bituminous and (*c*) Lignite. *Lignite* is a woody kind of coal, sometimes of a brown colour, and hence known as *Brown Coal.* It contains generally 70 per cent of carbon and 40 per cent of moisture. This coal is of an inferior type. It has value for the production of gas, synthetic liquid fuel and for domestic heating. Only in Germany is lignite used for fuel purposes. The world production of lignite in 1969 was 765 million metric tons with share of East Germany at 246 million metric tons, of U.S.S.R. at 140 million metric tons, of West Germany at 107 million metric tons, of Yugoslavia at 26 million metric tons and Australia 24 million metric tons. *Anthracite* is difficult to light and burns with little flame but produces great heat when it burns. It is of the best variety but no country has large deposits of this kind of coal. *Bituminous* coal contains more than 80 per cent. of carbon. It is mostly used as fuel for domestic purposes, for transportation and for power.[16]

The principal coal-producing countries are the U.S.A., U.S.S.R., West Germany, U.K., France, Poland, Belgium, China, India and Australia. The leaders in the production are U.S.S.R., U.S.A., West Germany and U.K. Although these countries support 25 per cent. of the world's population, they produce approximately 60 per cent of the world's total output of coal.

The U.S.A. which occupied the first position till 1969 is now the second leading coal producing country in the world. Her position is first or second after U.S.S.R. There are three important coal-fields in the U.S.A.: (*i*) the Appalachian coal-fields, (*ii*) the Rocky fields and (*iii*) the interior coal-fields. The Appalachian coal-fields from Pennsylvania to Alabama, contain the finest bituminous coal in the world. Pennsylvania alone contributes nearly half of the total supply of the U.S.A.

[16] Bituminous coal is the source of *coke*, that is, some coals leave a porous grey residue when heated in ovens with little air and relieved of certain volatile and liquid components. Coke is a clean efficient household fuel and is used in the smelting of iron ore and the manufacture of steel.

The interior field includes Iowa, Kansas, Illinois, Indiana, Missouri, Dakota and Nebraska. The Rocky fields have not yet been fully explored because population is sparse there. The probable total reserves of coal in the U.S.A. are estimated at 2,010,537 million metric tons of which the main concentrations are in Illinois, West Virginia, Kentucky and Pennsylvania. There has been tremendous mechanisation in the method of extracting coal in the U.S.A. She is first in production of coal per man-day. In underground mining the average output per man-day is about 7 tons, and the average output in surface mining per man-day is from 15 to 19 tons. At the same time, the chances of accidents and fatalities in underground mines have increased with mechanisation due to explosions of methane gas and falls of roofs.

Great Britain occupies the third position in coal production. Britain has workable reserves of coal of 43,000 million tons. The coal-fields of Great Britain have three great advantages: —

(*a*) Coal and iron are found together.

(*b*) Coal-fields are within easy reach of the sea.

(*c*) Limestone, useful for smelting, is often found with them.

In Great Britain there are four important coal-fields: (*i*) Scotland area, (*ii*) Pennine Range area, (*iii*) Midland area, (*iv*) South Wales area. In Scotland rich deposits of coal are found in the Clyde basin, in Ayrshire and along the bank of the Firth of Forth. These areas have exceptional transportation facilities by sea, canal and rail. The Clyde basin is the most important ship-building centre of the world. On either side of the Pennine Range there are large deposits of coal. Lancashire and Yorkshire are the two important centres in this area. Cotton textile industry has developed in Lancashire and woollen industry in Yorkshire. In the Midland area the important districts are North Staffordshire, Leicestershire, Warwickshire and South Staffordshire, where many important industries (like motor car, cycle, boot, lace, tobacco, iron and steel and watch) have developed. South Wales coal is worked more for export than for use as power in the local industries.

Till 1914 the United Kingdom was the leading coal-exporting country in the world. "The proximity of British coal districts to the sea, together with the special quality of the

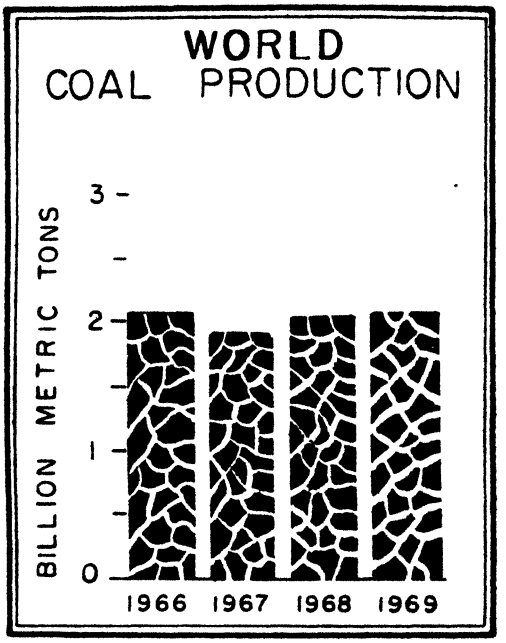


Fig. No. 31. World Coal Production.

coal, favoured the development of coal exports to European markets; so that even Germany, with an export trade of her own, found it cheaper to obtain coal from England for the districts served by her Baltic ports than to bring it overland from Silesia and Westphalia." After 1921 the conditions became highly unfavourable to the British coal industry. The advance of oil and of hydro-electric power; the increased use of lignite, economies in combustion and the development of new coal resources in many countries affected her coal exports adversely. Britain exports coal to Denmark, Sweden, Germany, the Irish Republic and Italy. In January 1947 the coal-mining industry of Great Britain came under public ownership and control by the Nationalisation Act of 1946. A Board has been set up with the monopoly of working and

getting coal in Great Britain. The Board is concerned with the reorganisation and increased mechanisation of existing mines and the sinking of new ones.

In respect of anthracite and bituminous coal production the Federal Republic of Germany occupies an important place. The production of anthracite and bituminous coal in Eastern Germany is only about 1·7 million tons a year. The Ruhr basin, Westphalia, Saxony, Silesia, and Bavaria are the important areas. The Ruhr basin produces about 80 per cent of Germany's coal. With regard to the production of lignite, Eastern Germany is the greatest producer and accounts for about 45 p.c. of the world's total.

France is rather deficient in coal. Normally, France raises about 45 million metric tons of coal a year. There are small coalfields scattered about the country, in the Lorraine, near St. Etienne, near La Crusot and in the Rhone delta. The total production is enough to supply only two-thirds of France's moderate industrial needs. Consequently France has to import coal from other countries.

Soviet Russia is now the largest coal producer. From 64 million tons in 1932, the output was more than 650 million metric tons in 1970. This tremendous growth of coal output was due to highly increased mechanisation of all the mining processes and the discovery and exploitation of new fields in all parts of the country. The Donetz basin is the most important coal basin in the U.S.S.R., and provides the entire metallurgy of the South with metallurgical fuel. It also supplies power generating fuel to the entire large scale industry in the Southern U.S.S.R. as well as the railways of the Ukraine and Byelorussia. The other principal coal-fields of Soviet Russia are the Kuznetsk coal basin, the Karaganda basin, the Moscow basin, the Pechora basin, and the Kizel and Chelyabinsk deposits in the Urals. The Kuznetsk basin is second in importance, though with regard to the size of coal reserves, it occupies the first place in U.S.S.R. and second in the world. This region is full of high grade coals but distance from the industrially developed areas delayed its development till recently. The Karaganda basin is situated in the central part of Kazakstan. In view of the rapid industrial development, the annual rate of coal pro-

duction is to increase further. It is quite likely that coal will receive greater investment for expansion in U.S.S.R.'s next plan period.[17] The probable total reserves of coal in the U.S.S.R. are estimated at 1,322,723 million metric tons which is about 30 p.c. of the world's total.

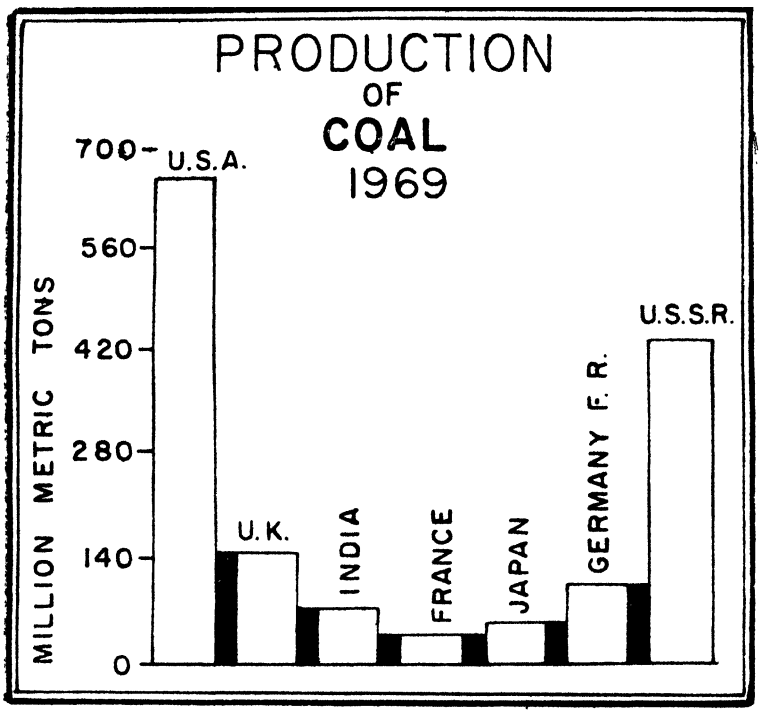


FIG No. 32. Production of Coal—1969

South Africa has large deposits of coal in Natal, the Cape of Good Hope and the Transvaal. The coal is of poor quality, with the exception of that of Natal. The coal production in the Union is about 50 million tons a year.

[17] The total sum of investment in the coal industry for the five year period 1966-70 was 6,600 m roubles. The all-round mechanisation of mines has no doubt led to some decline in the number of workers. However, all retrenched workers are given opportunities to learn a new trade, and the workers' seniority does not suffer on account of the change of place of work.

In 1969 Japan raised about 45 million tons of coal. In spite of this large production, Japan's industrial expansion plan is hampered by local shortage. The two most important coal-fields of Japan are located in Hokkaido and in Kyushu, the former supplying 40 p.c. and the latter 50 p.c. of the country's total coal. More than 90 p.c. of her coal is of mediocre quality —low bituminous or sub-bituminous. Her coal is not generally suitable for the production of high quality metallurgical coke. Japan's annual production of lignite is a little more than one million tons.

China is very rich in coal but its development is slow because the great bulk of China's coal lies in the midst of mountains in the north-western and south-western parts of the country, far from water transportation. These areas are also scantily populated and do not contain much metallic ores. Chinese coal is chiefly of anthracite type, and is found practically in every province. The provinces of Shansi, Shensi, Kansu and Honan contain the greatest deposits of coal. The Loess Highlands have about 90 per cent of China's reserves of coal. The production of coal is more than 450 million metric tons a year. The great progress in coal production of China can be appreciated from the fact that in 1948, the output was only 32 million tons. In fact, such progress has no parallel in the history of any country. The probable total reserves of coal in China amount to 1,115,098 million metric tons, which is 19 p.c. of the world's total.

India occupied the seventh place in the list of the coal-producing countries of the world in 1969 with her production of 75 million tons. The coal-fields, however, are very unevenly distributed, and more than 83 p.c. coal of India comes from the two fields of Raniganj in Bengal and Jharia in Bihar. Other fields are found in Madhya Pradesh, Andhra, Orissa, Assam and Rajputana. The probable total reserves of coal in India are 71,624 million metric tons, that is 1·3 p.c. of the world's total. In Pakistan, coal is found only in the West Punjab. The production of coal in Pakistan in 1969 was about 1·1 million tons only.

The world's coal reserves, estimated at 5,767,428 million metric tons, are distributed unevenly. U.S.A., Canada and Alaska have 40 p.c., U.S.S.R. and China 42 p.c., South Africa

4 p.c., U.K. 3 p.c. and India 1 p.c. The largest percentage is in U.S.A. with 35, followed by U.S.S.R. with 30 p.c.[18]

The large deposits and reserves, and the universal use of coal will keep it a wanted material for many more years even if in the meantime other sources of energy are further developed. It is very doubtful whether the world has sufficient uranium to bring about a complete revolution in the industrial set up and make atomic power production available at a price which would seriously compete with coal. Similar doubts about the future of coal were expressed about fifty years ago when large developments in the production of petroleum and hydro-electricity took place. Coal remains the leading source of power.

Nevertheless, there is room for conserving this irreplaceable natural resource. Some of the conservation measures are the promotion of avoidance of waste in mining, the promotion of avoidance of waste in preparation, improvement of quality of lignite by using it as fuel, and pushing research into various improvements in coal exploitation and use.

Petroleum[19] —It is a general name given to oil, which flows freely or is pumped from holes or bores in the earth. Petroleum is associated with lowlands, generally on the flanks of recently folded mountains. The old block regions such as most of Africa, the Deccan, the Highlands of Brazil and the 'Shields' of Scandinavia and Canada do not contain oil. In August 1859, the first oil well in the world was drilled at Titusville, Pennsylvania. At that time, mineral oil was known and used only as a primitive form of illuminant or lubricant. Today, it provides an immense range and variety of products for many thousands of different applications and meets one-half of the world demand for energy. Oil offers certain definite advantages over other fuel inasmuch as it flows in pipes, can

[18] The Soviet scientists, however, claim that it contains 58 p.c. of the World's Coal deposits. (The Statesman's Year Book 1971-72, p. 1411).

[19] The name petroleum is derived from two Latin words: Petra (rock) and Oleum (oil). Although its existence was not unknown in ancient times, the modern importance of petroleum dates back only to the mid-19th century when kerosene lamp was invented. Later, with the beginning of twentieth century, the introduction of internal-combustion engine made it the most wanted fuel.

be moved easily and fed into machines and contains a very high amount of energy in relation to its weight.

Petroleum is found in all the continents with highest production in North America and least in Australia.

REGION-WISE DISTRIBUTION OF CRUDE PETROLEUM

1970

(In 1,000 metric tons)

North America	...	693,500
Middle East	..	711,940
Far East	...	60,695
South America	...	27,820
U.S.S.R.	...	353,000
Africa	...	272,190
Australia	...	8,350
World Total	...	2334,000

Reserves.—Proven and indicated crude oil reserves of the world totalled 272,402 million barrels at the end of 1968. Of this 50 per cent is located in the Middle East and 20 per cent is in North America and South America. The United States holds 30,000 million barrels, or 12 p.c. of the world total. The Kingdom of Kuwait on the Persian Gulf has 60,000 million barrels; Saudi Arabia, 47,000 million barrels; Iran, 33,500 million barrels; Venezuela, 16,000 million barrels; Iraq, 25,000 million and Russia 27,500 million barrels.

The other reserves are in India (500 million), Algeria (3,500 million), Canada (3,165 million) and Mexico (2,500 million). is interesting to note that in Asia, India has the highest reserves, and the world's highest is in Kuwait.

At the current rate of consumption, the reserves are likely to last about thirty five years. There are however chances that with the use of more sophisticated methods 50 p.c. of the reserves which are considered now not recoverable will be recover-

Also, drilling in deep water at sea will increase the present erves. All the same, the relationship between production nd reserves will have to be rational.

The output of petroleum has increased substantially in all major producing areas of the world in recent years. Also, there has been an increase in the sources of supply of petroleum. The number of countries with an annual output of more than 10 million tons or more was 20 in 1967 as against 9 in 1955. Petroleum accounts for one-tenth of the total value of international trade. It provides virtually all the exports of eight

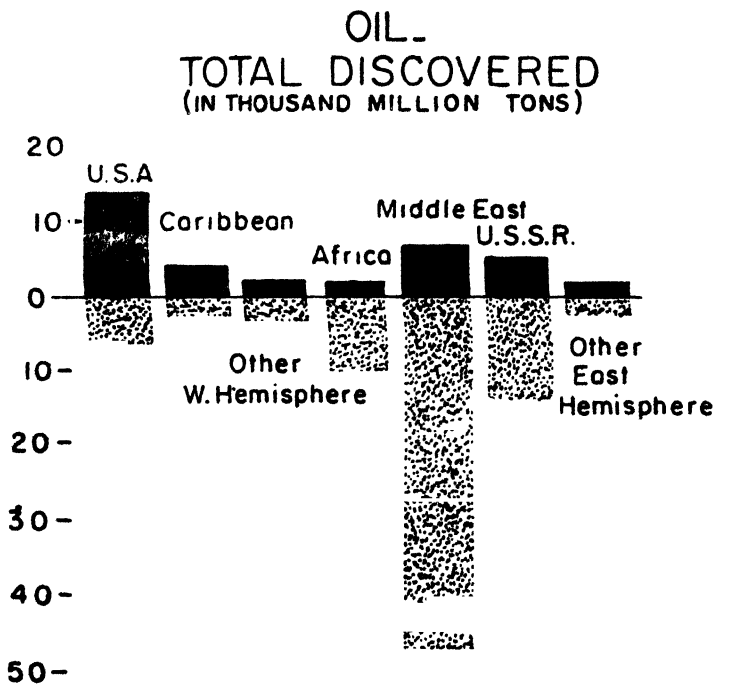


FIG. No. 33. The shaded portions indicate oils discovered between 1885 and 1970. The dotted portions indicate the total of reserves.

countries in the Middle East and Africa, and over 90 p.c. of Venezuela's exports.[20]

[20] Most of the petroleum internationally exchanged is carried by sea-tanker fleets which account for one-third of the world's mercantile fleet. The Suez owes 70 per cent of its traffic to petroleum. Petroleum accounts for 85 to 100 per cent of total export values from Kuwait, Libya, Saudi-Arabia, Iraq, Venezuela and Iran, and 40 per cent from Indonesia.

The leading petroleum producing countries in the world are U.S.A., U.S.S.R., Venezuela, Saudi Arabia, Iran and Kuwait.

Use of Oils

The chief products of petroleum are gasoline or petrol, fuel oil, kerosene and lubricants. These are used in steamships, aircrafts, automobiles, rail-roads, manufacturing and commercial heating and domestic heating. In the total oil consumption of the world, 33 per cent account for motor gasoline, 2 per cent aviation gasoline, 6 per cent kerosene and jet fuel, 22 per cent distillate fuel and 35 per cent residual fuel. Of late, the share of the oil in the total primary fuel consumption is very much on the increase in most of the industrialised countries.

CRUDE PETROLEUM

('000 metric tons)

	1960	1967	1970
Argentina ...	9,138	15,953	20,000
Bahrein ...	2,256	3,469	3,800
Austria ...	2,448	2,685	2,800
Canada ...	25,614	47,349	69,500
Columbia ...	7,674	9,603	11,000
India ...	445	5,667	6,800
Indonesia ...	20,596	25,310	45,000
Iran ...	52,185	128,761	190,000
Iraq ...	47,460	60,217	75,600
Kuwait ...	81,867	115,175	138,000
Mexico ...	14,171	19,019	21,000
Saudi Arabia ...	62,068	129,304	175,500
U.S.S.R. ...	147,859	288,000	353,000
U.S.A. ...	347,975	435,537	534,000
Venezuela ...	152,364	185,409	193,000
WORLD TOTAL ...	1056,700	1758,700	2334,000

The consumption of petroleum has grown faster than the consumption of energy as a whole.

The main oil-consuming countries of the world were U.S.A. (35 p.c.), U.S.S.R. and East Europe (15 p.c.), Japan (6 p.c.), West Germany (5 p.c.), Britain (5 p.c.), Canada (4 p.c.), France (4 p.c.) and Italy (4 p.c.).

While the consumption of oil increases by 7 per cent annually, the general increase in respect of all energy is 5 p.c. annually. Thus, petroleum accounted for 36 p.c. of the energy consumed in 1967 compared to 29 per cent in 1955. In contrast, the share of coal and lignite was 70 p.c. in 1953, but came down to 44 p.c. in 1969.

All the major powers of the world are seeking to gain control of oil-fields and are searching diligently for possible reservoirs not yet discovered. During the last few years the struggle for the possession of petroleum has been so keen that the control of major oil-fields has caused more international concern than that of any other mineral.

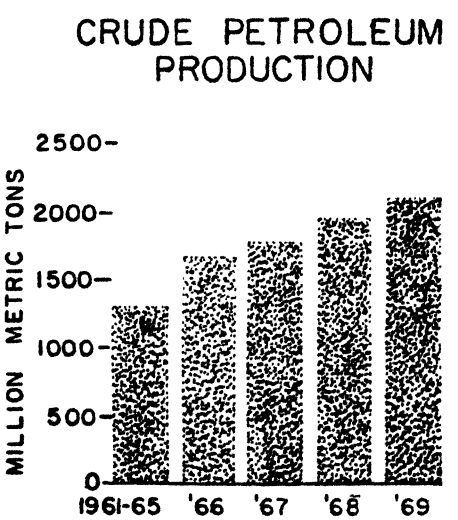


FIG. No. 34. Crude Petroleum Production

The Leading Producers

The U.S.A. is the largest petroleum producing country the world. It raises more than 20 per cent of the world's ou

put. The supply comes from the important states of Oklahoma, California, Texas, Kansas, Louisiana, Illinois, Pennsylvania, Ohio, West Virginia and Kentucky. The oldest producing area includes Pennsylvania, Ohio, Virginia and Kentucky and raises oil of a very high quality. The Gulf Coast Field of Texas and

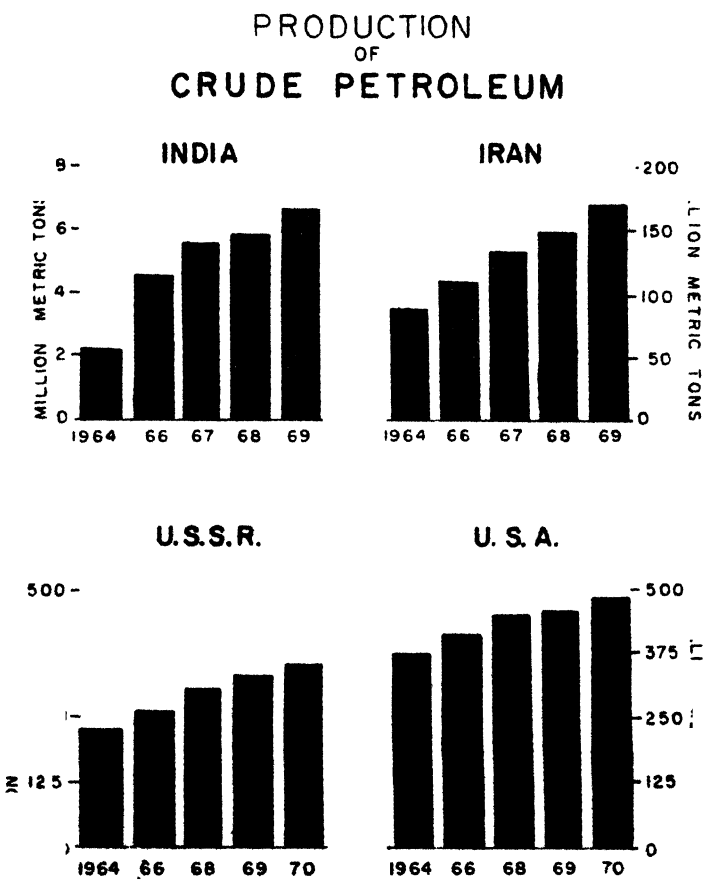


Fig. No. 35. Production of Crude Petroleum

Louisiana is a new oil area which has been extensively developed. California's oil production is confined to the districts of Los Angeles Basin, the Coastal district and the San Joaquim valley. The production of oil in Illinois is on the decline. A large portion of the petroleum of the country is exported. Its

markets are scattered all over the world. This is only natural in the case of a commodity having such important uses. Despite the enormous increase in output, the demand has gone up in excess of supply with the expansion of aviation, road transport and the conversion of many steamships of fuel instead of coal. The largest oil-field is found in East Texas. It has a length of about 40 miles and an average breadth of about 7 miles; 25,800 wells have been drilled.

The United States has the largest consumption of petroleum per head and moderate yearly rates of increase. Petroleum accounts for about 40 per cent of the total energy consumption in the country. The annual rate of increase in demand for petroleum is 3 per cent. The U.S.A. has been the largest producer of petroleum since 1913. Its share of world production however is on the decline even with increasing output. Its present output is still about 25 p.c. of the world's total. Domestic production is protected from cheaper foreign crudes by import restrictions. There are also controls on the expansion of oil production in the U.S.A. in order to maintain the country's reserves of oil for strategic reasons. These controls are leading to a steady erosion in the U.S.A.'s dominant position in the world as an oil supplier.

Soviet Russia takes the second place in the production of petroleum in the world but she leads the world in both the rate of growth of oil production and in the amount of absolute annual increase. The advances in oil production are due to the application of entirely new extracting processes with the result that the oil-bearing strata have yielded increasingly more oil. Her two main fields, Baku and Grozny, on opposite sides of Caucasus, are connected by pipe-lines with the Black Sea. Baku District on the Apsheron Peninsula is the leading producer of oil, from where the product is sent by pipe lines to Rostov and Batumi. The oil belt of the U.S.S.R. extends along the whole length of the Urals on their western side from Ukhta in the north to Sterlitamak in the south. Ufa in the south-western slopes of the Urals has become so important in recent years that it has come to be known as "Second Baku". Uzbek, Kazakh and Turkmen in Soviet Asia contain large deposits of oil. In the Far East, the only Soviet oil-field is in the island

of Sakhalin where the annual production comes to about 1 million tons.

Russia has increased her oil production from 29 million tons in 1948 to 353 million tons in 1970. New oil pipe lines and new refineries near oil-consuming centres have been built during this period.

In Soviet Union, the importance of petroleum has been steadily increasing, and in 1969 petroleum accounted for 38 p.c. of the total energy utilization. Petroleum is a key element of the economic plan and of the great industrial expansion. The Volga-Ural region is the main producing area which has long distance pipe-line connections to carry the output to Eastern Europe.

The Soviet underwater oil-fields in the Caspian Sea produce 6 million tons of high-quality oil a year. Situated 60 miles out to sea from Baku, these oil-fields cover about 10 square miles and are capable of almost unlimited development.

The increase in oil consumption per year in terms of percentage in the U.S.S.R. has been 9 p.c. between 1960 and 1970 as compared to 4 p.c. in U.S.A., 15 p.c. in West Germany, 21 p.c. in Japan and 13 p.c. in France. Consumption of oil per head of population over the same period was as follows (in kg).

		1960	1970
U.S.S.R.	...	550	1,150
U.S.A.	...	2,860	3,600
West Germany	...	585	2,200
Japan	...	335	2,000
U.K.	...	950	1,900

Venezuela which was the second largest oil producer till 1960, is now behind the U.S.S.R. with about 185 million tons. The oil-fields are mostly located around Lake Maracaibo. The production has also been extended towards the Orinoco belt but in the east.

Outside the U.S.S.R., the largest producer in Europe is Rumania. In **Rumania,** oil is found at the southern foot-hills of the Carpathians, from *Suceava* in the north to the *Damboritza Valley* in the south. The largest oil-fields are in Damboritza

valley (54 p.c.), Parhova (44 p.c.), Buzau and Bacau. These oil-fields were first worked in the eighties of the last century. The development of Rumanian oil-fields was the result of the assistance of foreign capital and the sympathetic attitude of the Government. The importance of this industry to Rumania can hardly be over-estimated. Of the total production, between 70 and 80 p.c. is exported. The foreign exchange position and that of the national finances therefore depend very largely on oil. In 1967, Rumania raised 13 million metric tons of petrolium.

Middle East : The Greatest Oil Producing Region

The Middle East with Iran, Iraq, Saudi Arabia, Bahrein and Kuwait is the most productive oil area in the world. The oil-fields of this region are being worked by foreign enterprise

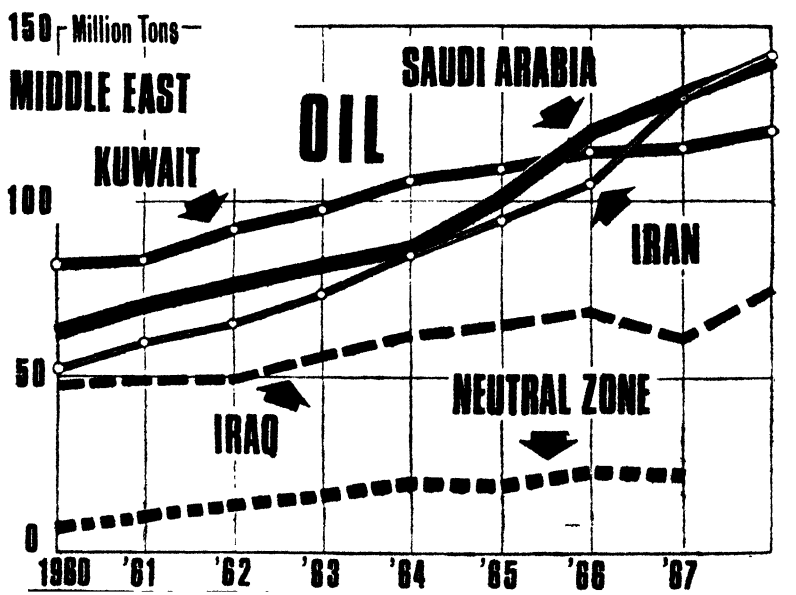


FIG. No. 36. Middle East Oil

—the Iraq and Iran fields by the British, the Saudi Arabia and Bahrein fields by America and the Kuwait field by joint Anglo-American companies. With more than half the world's

proved reserves, the Middle East raised about 712 million metric ons of crude petroleum in 1970. The area's share of world production rose from 6 per cent in 1938 to 23 p.c. in 1969. Development of its petroleum industry on a large scale is ontinuing. Several new fields have been discovered as a result f exploration activities. Pipelines and other transportation acilities have been extended. The Middle East oil-fields are Bahrein, Iran, Iraq, Kuwait and Saudi Arabia. The major portion of Europe's demand for oil is supplied by the Middle East. Because of the rapid increase in the consumption of petroleum products in Europe and the favourable competitive position of the Middle East, the demand for petroleum of this rea has greatly increased. Except for the oilfields of Iraq, production is centred on the Persian Gulf and in its waters.

CRUDE PETROLEUM PRODUCTION IN THE MIDDLE EAST

(In '000 metric tons)

	1948	1958	1967	1970
Bahrein ...	1,492	2,034	3,469	3,800
Iran ...	25,270	40,816	128,761	190,000
Iraq ...	3,427	35,670	60,217	75,600
Kuwait ...	6,393	70,226	115,175	138,000
Qatar ...	—	8,222	15,479	17,000
Saudi Arabia ...	19,052	50,131	129,304	175,500

Iran is an important producer of oil. The existence of oil in Iran has been known for centuries, but the real development began in 1927. Today, with more than 190 million tons of crude petroleum production, Iran is the fourth largest producer. The petroleum industry employs about 90,000 Iranians.

In Iran, the principal oil-fields are in the South-West around Kazistan. These fields are at Musjid-I-Suluman, Haft-kel, Gach Saran, Agha Jari, Naft Safid and Lali. Musjid-I-Suluman was the first to produce oil in 1908, followed by Haft-kel in 1928, Gach Saran in 1941, Agha Jari in 1944, Naft Safid in 1945 and Lali in 1948. There are pipe-lines from these oil-fields to Abadan, a port on the Shatt-el-Arab. Abadan has today the largest oil refinery in the world, its daily capacity being half a million barrels a day. The Iran Government

initiated the policy of petroleum nationalisation in March, 1951 which brought about a sharp decline in production to 1.4 million tons. After 1955, the output steadily increased.

In Iraq, the oil-fields are situated at Baba Gagur, a few miles north of Kirkuk. The Kirkuk oil-field in Iraq stretching for 70 miles, is one of the greatest single oil-fields in the world. These oil-fields are being exploited by a British Company. A pipe-line has been constructed to join these fields with the Mediterranean sea-board. The pipe-line carries annually four million tons of crude oil to Haifa, 620 miles away, and to Tripoli, 540 miles away. At Haifa and Tripoli the oil is loaded into sea-going tankers and transported to the world's markets.

Kuwait, Iraq and Saudi Arabia supply about 60 p.c. of the world's total export of oil. The development of the oil resources of the Middle East has reduced the demand for American oil in the European countries. To relieve the pressure of demand further for American oil, it will be necessary to solve the transportation problem in the Middle East by constructing pipe-lines from the Middle East fields to the Mediterranean coasts. At present the Middle East oil is carried by tanker-fleet.

Since the crude oil production in the Middle East has become extremely profitable, the Government in the areas where the oil-fields are located are putting claims for bigger share in the earnings from royalties. This trend, however, has not resulted in a higher price of petroleum because of the constant discovery of new oil-fields. It is interesting to note that competition and low earnings on investments are the two features of the oil industry today. In recent years, the Middle East has been facing competition in Western Europe from North Africa. Algeria which started production in 1958 can now raise more than 44 million metric tons of crude petroleum. Libya, too, has become an important producer. Western Europe is the market for all these producers.

Oil-fields in Asia

Outside Middle East, there are six countries in Asia whose total annual production in 1969 was 40 million tons. Indonesia

alone produced 36 million tons. The other producers are Brunei and Sarawak (5 m), India (7 m), Pakistan, Burma and Japan. Pakistan raises 500,000 tons of petroleum annually. In India oil is raised at present in Assam and Gujarat. Rajasthan and West Bengal are possible areas of oil production. In Burma, the most prolific oil-fields are found in Irrawady valley from which nineteenths of the indigenous petroleum are obtained. Burma's production in 1970 was 1 m ton.

Oil production in Indonesia is steadily increasing, and was worked and financed by the Dutch and U.S.A. companies. The Indonesian Government is now following the Argentinian pattern of entering into exploration and development contracts with foreign companies. The importance of the oil-fields of Indonesia lies in the fact that this country is the only large producer of oil in the South-East Asia. Palembang district of Sumatra raises about 65 p.c. of the oil, followed by Borneo with 20 p.c.

Japan's petroleum belt lies along the Japan sea-coast from Hokkaido on the north to Northern Honshu. The western part of North Honshu includes the country's two principal oil-fields, the Akita and the Nilgata. From these two fields, 95 p.c. of Japan's domestic oil supply is derived. In 1970 Japan raised 800,000 tons of crude oil.

Pattern of petroleum trade and seven majors

The pattern of petroleum trade has been determined by two basic factors: the concentration of the sources of petroleum exports in a few non-industrialised countries, and the overwhelming demand for petroleum by industrialised countries of Western Europe, the U.S.A. and Japan. Petroleum flows from Venezuela to U.S.A., Western Europe and Canada, from Middle East it moves to Western Europe, Japan, India and Australia, and from North Africa it goes to Western Europe mainly. Among the principal oil-importing regions, Western Europe takes the first place with 49 p.c., followed at a considerable distance by U.S.A. and Japan with 17 p.c. and 15 p.c. respectively. For more than a decade after World War II, seven

oil companies dominated the international oil business, and had between them 90 p.c. of the crude reserves. These seven companies, known as *seven sisters of the oil empire,* are the Jersey Standard, Royal Dutch Shell, Mobil, Texaco, Gulf Standard oil of California and British Petroleum. Even today, these seven majors have an imposing sale, and account for 70 p.c. of the overseas crude production and a little less than 50 p.c. of refining. The narrow band stretching from Algeria to Iran contains the world's richest reserves of petroleum, and is worked by the seven majors. The entry of new companies means challenge to the seven majors, which maintain an international price structure on the basis of what they can readily market.

Conservation of Petroleum

The rate of growth in petroleum consumption in the world since 1964 has been 8 per cent a year. Although supply of oil from major sources is also rising at varying rates, signs of depletion of reserves of oil are distinct and even disquieting in many places. Some of the reserves will be too expensive to recover in competition with other energy sources. Exploration of new oil-fields is most active in Egypt, the U.S.A., India, Palestine, the U.S.S.R., Australia, Ghana, Nigeria and Burma. In addition efforts are being made to exploit off-shore oil reserves. In the U.S.A. the off-shore drilling operations in water as deep as 175 feet in Louisiana have made good progress. Off-shore drilling is also becoming popular in other parts of the world with the Persian Gulf as the most important area. Off-shore drilling activity in future will extend to Trinidad and Borneo regions, and the North Sea. However, new fields will not be there always, or they may not last long. There is, however, need for conservation measures to extend the availability of economically recoverable reserves for as long a time as possible. The conservation measures should extend to both production and consumption. Conservation in production means using methods which will minimise waste in the process of production. Conservation in consumption refers to economy in marketing methods and use of other sources. Already, in many advanced countries, there is a slowing down

in the rate of substitution of petroleum for coal in industry. The newer sources of energy such as natural gas and atomic power will without doubt bring about a decline in the growth rate of petroleum consumption. In some countries of Europe, alcohol is mixed with petroleum to the extent of 20 per cent for motor vehicles. The sources of ethyl alcohol are oil-seeds, sugar-cane, potatoes and timber. Germany produces synthetic oils by the hydrogenation of coal and tar.

Future trends

Crude oil supplies among developing countries are likely to increase in the Middle East and Africa. There is no immediate fear of tightness in the world market for petroleum because exports of petroleum are projected to increase at a rate of about 8 per cent per annum, a rate of increase greater than that for world consumption.

In future, the composition of world trade in petroleum and its products will alter in view of the increasing growth rate of refinery capacity in developed countries. The share of crude petroleum imports in developed countries may increase to 85 per cent by 1975 from around 80 p.c. in 1966.

The Organisation of Petroleum Exporting Countries (OPEC) was set up in 1960 with a view to co-ordinating and unifying the oil-policies of its member countries as an inter-governmental body. At present, there are eight members—Indonesia, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia and Venezuela. These countries which accounted for 85 p.c. of world oil exports in 1965 and contain 70 p.c. of oil reserves have come in conflict with the seven majors. More recently, OPEC has introduced a programme to limit excess production in order to stabilize prices.[21]

[21] Oil exploration, production and marketing in the world have been for long controlled by seven companies or seven sisters owned by the U.S.A., Dutch, U.K. and French. Not only are these companies the giants in the oil world, they also determine the prices of crude petroleum and petrol. Recently a *new* force of joint ventures between oil-producing and oil consuming countries is coming up.

Natural Gas

Natural gas has become the latest growing energy fuel world-wide. It meets today one-third of U.S. energy consumption and one-fifth of the energy use in the world. It is found commonly in association with petroleum and their geographical distribution is roughly similar. Natural gas is found in all the five continents. Its practical use was found in 1820 in the U.S.A. when a gunsmith piped gas to nearby houses to supply light in burners. At present, it has a wide range of uses though the principal use remains as a clean, convenient, economical source of heat in homes for cooking, water heating and refrigeration, in commercial establishments and industries for all sorts of processes which require heat. In the converters of steel mills, natural gas is an excellent source of heat. As fuel, it is used in oil refineries and gas plants. Further, much gasoline is obtained from natural gas. Nearly 80 p.c. of the world's natural gas is raised in the U.S.A. where it is exploited in the Appalachians, Gulf Coast and the central region. Soviet Union is the second largest producer with only one-fourth of U.S.A.

Mention may be made of Uzbekistan in Soviet Union where rich deposits of natural gas have been located in the Ferghana valley, Surkhan-Darya and Kashkra-Darya. The reserves of natural gas in the Bukhara-Kiva are the richest in the world. The proper exploitation of natural gas in Uzbekistan will bring enormous economic changes in the future and may make import of coal unnecessary. Uzbekistan has already become one of the Soviet Union's industrial bases.

In Asia, the production of natural gas is confined to Iran, Indonesia, Japan and Pakistan, of which Indonesia alone accounts for two-fifths of the production. A little production is also found in Burma and Taiwan. In Europe, the leading producers are France, Austria, Italy, Rumania and Poland. The only continent where the production is as yet insignificant is Africa.

Although most natural gas deposits have been found in the search for oil, there are successful explorations of natural gas close to consuming areas. The location of gas or oil deposits is found from rock strata in which gas or oil has been formed.

NATURAL GAS

(Million of cubic metres)

		1961	1967	1969
Canada	...	18,293	48,081	62,378
Indonesia	...	2,561	2,776	4,287
Pakistan	...	982	2,012	2,814
Italy	...	6,863	9,354	11,959
Mexico	...	10,210	16,223	17,218
U.S.S.R.	...	58,981	157,445	181,121
U.S.A.	...	280,391	514,558	580,100
WORLD	...	604,900	823,200	980,100

The limit to which a field can expand, depends not only on the quantity but on the cost at which it is produced. The main problem in the production and marketing of natural gas is the storage. Pipe-lines no doubt carry gas from the field to the market, but very big tanks are necessary to store reserves above ground.

There is need to stimulate discovery of natural gas resources. Also, waste in the production of natural gas should be avoided, and full advantage should be taken of the driving force of natural gas in lifting oil in order to get maximum economic recovery of the oil and gas.

Water-Power

The use of water as a natural liquid to produce energy in controlled amounts has become common in countries where the conditions of water flow are favourable. The power of water in the natural processes of nature is enormous, although so far only a small percentage has been developed. The common form of using water power is the exploitation of the difference in head or drop of water from a certain height, on streams and rivers. Water-power has now become a major source of mechanical energy, revealing a new phase of industrial usefulness.

Unlike coal, hydro-electricity is inexhaustible. Water-power is a perpetual mine, and every horse power generated

hydraulically represents an annual saving of approximately 4 tons of coal. Its introduction has freed many countries from the great drawbacks arising out of the absence of coal. The great disadvantage of water-power is that it cannot be used either in aviation or in shipping.

Geographical Conditions and Modern Adjustments

Broadly, hydel power is obtained from run of river and storage. The power output will vary in the case of run of river, depending on its flow characteristics during the year. If the rivers run dry, the generation of power will be suspended; but with maximum flow, there will be increase in power generation. Such variations in the flow of water cannot ensure regular supply of power for commercial and industrial purposes. Consequently, presence of certain geographical conditions in locations where water power is developed, are looked for:

(*i*) abundant precipitation,

(*ii*) fairly uniform discharge of water through streams resulting from (*a*) uniformly distributed precipitation or (*b*) regulation of stream flowing through natural lakes, forested water-shed or artificial storage behind dams, and

(*iii*) a rough terrain which allows the water of a stream to be used and re-used for power development.

The volume of water and the height from which it falls will determine the amount of energy. The larger the precipitation and the slope, the greater is the volume of energy. If a river with these ideal conditions is located near an area of dense population, the transmission of power becomes comparatively cheap. A river or lake must be free from ice in winter. Another factor is the distance of the power site from the consuming area. Generally the power is not transmitted beyond 300 miles from any station. The generation of electricity from the currents of rivers or from falls is, however, extremely limited, and the most common practice is the construction of dams. Modern industry demands enormous storage reservoirs which are therefore made of concrete so that dams can withstand the great pressure of water.

In Sweden, where water power is abundant, some of the major sources are situated in the north—five or six hundred miles from the industrial south where power is needed. For long, these sources were not used. Recently, however, with the development of technique of electrical transmission at very high voltage, this power is brought to the south of Sweden.

Hydro-electric Development

The term 'hydro-electric development' refers to power plant that utilizes the force of falling water for the production of electric power. Electric power is a basic factor in developing the economy of country, and the two sources of electricity are falling water and fossil fuels. Electricity from water is known as hydel power. The advantages of energy in electrical form lie in the fact that it can be transported with comparative ease and can be adapted to different purposes. Indeed, interchange of hydro-electrical power is already taking place in Europe. It is possible for Norway to export hydel power to Denmark and Sweden through high voltage transmission, while undersea-transmission of Great Britain may soon be feasible through the development of high voltage direct current.

At present the development of water-power is almost confined to regions of high economic standing, of which two big areas stand out prominently. These are (*i*) Eastern U.S.A. with the adjacent parts of Canada, and (*ii*) Western and Central Europe. More than 60 per cent of the world's output of hydro-electric power is produced in these areas. Other countries in order of importance are Germany, Austria, Spain and U.S.S.R. There are, however, immense scope and possibilities of water-power in Africa which has 40 per cent of the world's potential water-power.

The North-Eastern region and the Pacific North-West region are the two important water-power areas of the U.S.A. New England in the eastern region and Washington, Oregon and Idaho make extensive use of water-power. The Niagara Falls also provide energy for a large number of hydro-electric installations. Development in water-power has also taken place

in Canada, where "practically every large industrial centre is now served with it". The success of the pulp paper industry of Canada almost depends on it. The potential water-power is well-distributed throughout, but the development has been limited as the big industrial centres are not many. In Northern British Columbia, Northern Manitoba and Northern Quebec, the power sites are almost untouched but hold out great promise for the future. But during winter, when the rivers and streams of the north are ice-bound, utilisation is greatly hindered.

France offers unique opportunities for great development of hydro-electricity on a number of rivers like Dordogne, Rhone, Truyere, Creuse and Isere. The highest dam is at Bort on the Dordogne with 330 feet height. The manufacturing industries and transport of the southern side can be best served by water-power. France is rich in iron-ore but deficient in coal. So it is possible that further development in water-power will take place in France in the near future for the utilisation of her iron-ore.

Italy and Switzerland have developed water-power to a great extent. In spite of the absence of coal and oil, Switzerland is essentially a manufacturing country where water-power is utilised not only in factories but also in railways. In 1961 Switzerland had installed capacity of hydel energy to the extent of 6 million kw. This tremendous increase in production has been possible because of the completion of a number of large installations in the Alpine valleys and along the upper Rhine between Lake Constance and Basle, as well as of smaller stations on the Mittelland and in the Jura valleys. In Norway and Sweden the streams are of major importance as sources of water-power. The abundant precipitation, snow-fields, glaciers and lakes in the highlands of Scandinavia and the number of falls and rapids make these rivers the most important sources of water-power in Europe. Germany has certain important installations in the south and south-west, but her resources of water-power are limited.

Japan is rich in water-power. The rugged surface of the islands, the swift flowing streams and the heavy, well distri-

buted, uniform rainfall provide ideal conditions for developing hydro-electricity. Most of the large power sites are located on the eastern and southern slopes of the mountains of Central Honshiu. Though the rivers of Japan are comparatively small, they are very swift making it possible to have small hydro-electric power from each river. "Many of these small installations are tied together in single power systems which supply the large cities". The first hydro-electric plant in Japan was established in 1892 in Kyoto on a stream flowing from Lake Biwa. Of the power produced, about 55 p.c. is consumed by industry in Japan.

Conditions of Water-Power Development in India

The presence of rivers and falls, abundant rainfall and mountains and hills have made India richly endowed with water power. There are, at the same time, certain disadvantages: (*a*) the seasonal character of rainfall and the resultant disturbance in the flow of water in rivers and (*b*) the distance of areas requiring power from the sites of hydro-electricity. Till 1947, there was not much progress of water power in India excepting for a few places in Maharastra, Kashmir, Punjab and Mysore. Big power projects like the Bhakra-Nangal, Damodar Valley, the Mahanadi Valley and others which were undertaken in 1948, are now supplying hydel power.

World Hydro-Electric Capacity

If all the physically possible sites are developed, the mean flow of the world's stream can produce about three billion horse power. The water-power installed capacity in relation to potential is 40 p.c. in Austria, 20 p.c. in Norway, 25 p.c. in Sweden, 30 p.c. in U.S.A., 45 p.c. in Japan, 16 p.c. in Canada, 18 p.c. in Italy and France each, and hardly 1 p.c. in India. Two factors stand in the way of their development; uneconomic cost and danger to nearby areas from inundation. Apart from rivers and lakes, the use of tides in places where high tides occur is technically possible, but the cost is high.

HYDRO-ELECTRIC INSTALLED CAPACITY

(in million kw.)

	1962	1965	1969
Brazil ...	4.1	5.3	10
Canada ...	19.3	30.3	39
West Germany ...	3.5	3.6	4.7
India ...	2.9	3.3	6
Italy ...	13.2	13.9	14.7
Japan ...	14.1	16.2	19
Spain ...	5.1	8.1	9
Switzerland ...	6.9	8.1	9
U.S.S.R. ...	18.6	22.2	30
U.S.A. ...	38.1	44.4	53

Conflicts between Purposes

Generation of electricity is one of the objectives of any hydro-electric development. There may be other objectives like irrigiation, navigation or flood control. This multipurpose development entails certain problems. The volume of water necessary for irrigation is not the same throughout the year, and, if flow of water is regulated on the basis of the needs of irrigation, the supply of hydel power will be affected. Likewise, for flood control the water storage basin should be kept at a low level so that it can hold maximum flood water, while, on the other hand, generation of hydel power requires that the storage should be full always. Thus there are conflicts between the several purposes.

Some Non-Metals

Sulphur[22] :— It is a non-metallic element and occurs normally in well-developed crystals and in earthy masses. The mineral is a very poor conductor of heat and electricity and is insoluble in water. Sulphur is widely used in agriculture and industry, mainly in the form of sulphuric acid—which consumes

[22] Sulphur is found in forms of native sulphur, sulphides and sulphates. The first two are the principal sources of sulphur. Sicily in Italy and the Gulf Coast in the U.S.A. are the main producers of common sulphur. Pyrites is an inclusive term used to designate metallic sulphides, and the main areas are Spain, Italy and U.S.A.

about three-quarters of the supply—and in other sulphur compounds, such as sulphur dioxide and carbon bisulphide. Sulphuric acid is the basis for agricultural fertilizers, such as superphosphate and ammonium sulphate, and is also required in the production of textiles and dyestuffs and in the metallurgical industries. Sulphur dioxide is used mainly in the woodpulp industry, and carbon bisulphide in the production of viscose. Sulphur is also used in the production of insecticides and in the manufacture of rubber products and explosives.

Sulphur is not widely distributed. It is generally found in volcanic regions in combination with other mineral products, specially with iron, lead, zinc and antimony.

Production of sulphur is mainly confined to U.S.A., Canada, Japan, Mexico, Spain, U.S.S.R. and China.

U.S.A. is the largest producer and exporter and dominates the world market. In 1969 U.S.A. produced 8.6 million metric tons of sulphur. The known and potential sources of supply in the world are quite sufficient to ensure good use of this mineral for many years.

PRODUCTION OF SULPHUR IN THE PRINCIPAL COUNTRIES

('000 metric tons)

	1961	1969
Canada	841	3,353
China	700	1,066
Japan	1,900	2,328
Mexico	1,200	1,774
Spain	1,056	1,234
U.S.S.R.	2,755	3,450
U.S.A.	6,842	8,698

Salt :—Common salt is one of the most essential chemical raw materials. It is found in the crust of the earth in a solid form known as rock salt or occurs in the form of subterranean brines. The sea is also one of the chief sources of this material, for it is obtained by evaporating sea-water. In addition to the universal use of salt in food, great quantities are used in packing and preserving fish, meat, hides and butter. Salt is used in the manufacture of soda, glass, bleaching powder, etc.

The annual world production of salt is between 55 and 66 million tons of which about two-fifths are used for industrial purposes.

The production of salt is widely distributed and is raised in most of the countries of the world. The principal countries are the U.S.A., U.K., Germany, India, France, China and U.S.S.R. Of the total production in the U.S.A., two-thirds are evaporated salt and the rest rock salt. In West Germany, 80 p.c. is rock salt.

SALT PRODUCTION, 1969

(Rock, evaporated and brine)

(In '000 metric tons)

U.S.A.	...	40,138	Japan	...	1,0
France	...	4,916	Canada	...	3,8
Germany (W)	...	8,961	China	...	15,0
U.K.	...	8,605	Spain	...	1,8
India	...	5,173	U.S.S.R.	...	12,1
Egypt	...	385	Mexico	...	3,3

The salt industry is one of the most important and olde industries in India. About 60 per cent of the Indian salt is ol tained by evaporating sea-water on the coasts of Gujarat, Maha rashtra and Madras. The other two sources are salt brine fro the Sambar Lake in Rajasthan and salt brine condensed on t border of the Runn of Cutch.

Graphite : It is a mineral consisting of only the elemen carbon and is widely used in the manufacture of crucible lubricants and lead pencils. About 70 p.c. of the annual pro duction of graphite is low-grade and is used as paint pigmen or for coating the insides of moulds for smooth finish. U.S.S.R is the leading producer, where more than one-third of th world's total is found. The next important producer is Kore though her production is much smaller than that of the forme The other producers are U.S.A., Madagascar, Ceylon, Italy an Austria.

Asbestos :— Of all raw materials for industry, asbestos one of the most remarkable. It is a fibrous mineral substan

as dense as the rock in which it is encased and yet a mass of tiny fibres which can be separated mechanically. Its fibres can withstand weather, water and fire. It is a non-conductor of both heat and electricity. This non-metallic mineral is used for making fire-proof safes and vaults, and also for brake linings and clutch facings in automobiles. The fibre can be woven into curtains for roofs and floors.

There are three main varieties of asbestos for commercial use—chrysolite, amosite and crocidolite. Chrysolite represents 95 p.c. of the world production and is raised mainly in Canada, U.S.S.R. and Rhodesia. Amosite is mined only in South Africa. Crocidolite deposits are found in South Africa, Bolivia and Australia, Chrysolite is soft, flexible and is suitable for textile processes. Amosite is hard and used in insulation boards. Crocidolite is resistant to acid.

The rise in asbestos production in recent years has been on account of the considerable extension that has taken place in the use of insulating materials, both for domestic and commercial refrigeration and in the field of construction where many of the new wood fibre and plaster boards and tiles incorporate appreciable proportions of asbestos.

The principal producers are Canada, Italy, Rhodesia, India and South Africa. The world production of asbestos in 1970 was 4 million metric tons of which Canada raised 1.4 million tons. The Quebec belt which is the principal producing area is about seventy miles long and six miles wide. About 97 p.c. of the Canadian fibre is exported of which 60 p.c. is imported and consumed in the United States, which is the largest consumer. Canada has about 952 million metric tons of asbestos reserves. U.S.S.R. is the second largest producer with about 890,000 metric tons. Brazil occupies the third place in respect of production, and her output was 350,000 metric tons in 1970. South Africa raises 8 p.c. of the world's total. Rhodesia, Mozambique, Bechuanaland and Morocco are the other producing areas of Africa. India raises a small quantity of about 7,000 tons of asbestos. The chief producing areas in India are Cuddapah district of Andhra, Singhbhum district of Bihar and Udaipur and Bhilwar districts of Rajasthan. Although the U.S.A. is the world's largest manufacturer of asbestos products,

its domestic supply of asbestos is very small, and most of it is imported from Canada.

ASBESTOS PRODUCTION

(In '000 metric tons)

1953	...	1,430
1963	...	2,640
1966	...	3,250
1968	...	3,400
1969	...	3,700

Mica :— It is a certain kind of silicate mineral with a very characteristic platy basal cleavage, which is an effect of its crystal structure. The development of wireless telegraphy, aeronautical science and motor transport have made mica very important for electrical insulation, in the manufacture of motors, dynamos, lamp sockets and high voltage induction apparatus. Mica is available in several varieties, but only three are most commonly used. These are muscovite or white mica, phlogopite or amber mica and biotite or black mica. Muscovite mica is the most important of all. Mica is used either as sheet or as ground or powdered mica. Indian mica is muscovite in variety and sheet in character. Canada and Madagascar are the producers of phlogopite mica. In the U.S.A., only a small percentage is of sheet-quality, and the rest consists of ground mica.

The chief producers are India, Brazil, Canada, and South Africa.

India has for many years been the leading producer of block mica with an output more than three-fifths of the world's total supply of this type. Mica is found in Bihar, Andhra (the Nellore), Tamil Nadu, Kerala and Ajmer-Merwara in Rajasthan.

In South Africa, the bulk of the output is from the Lomagundi district of Rhodesia. Rich deposits also exist in the Transvaal, Cape Province and Natal. India and South Africa are the only exporters. Although the U.S.A. is the second largest producer of block mica, it is a rather poor second, with only 1 p.c. In the U.S.A. mica, which is all waste and scrap

is found in North Carolina and New Hampshire. Mica is also found in small quantities in Australia, France, Germany, Norway, Spain, Portugal, Soviet Union, Japan and Argentina.

Precious Stones :— Search for precious stones is responsible to a large extent for stimulating trade and commerce. Diamond, ruby, sapphire, emerald and garnets are the chief precious stones scattered all over the globe. About 90 p.c. of the world's supply of diamonds comes from Africa. Although the diamond fields of major importance were discovered in India and Brazil in the seventeenth and eighteenth centuries respectively, it is Africa which dominates the world's diamond markets today. The first diamond field in Africa was discovered in 1869. Very small quantities are also raised in Brazil, India, New South Wales and British Guiana.

The industrial diamonds are in great use in the machine tool industry and in some newer uses such as in rock-drill heads for service in the mining industry. In order to grind and polish hard metals, lower quality diamonds are being extensively used nowadays. Furthermore, "diamond tools tend to supersede metallic tools, not only because of the increasing use of alloys and refractory materials which only diamond is hard enough to cut but also because the use of diamonds gives a higher degree of precision, faster working speed and longer tool life."

For more than two decades, Congo has remained as the largest producer of diamond. It raises about 50 p.c. of world's total, most of which consists of industrial diamonds. The gem-diamonds come from the Union of South Africa and South-West Africa. The world production of diamonds in 1967 was 41 million carats.

Although India is known for its diamonds for thousands of years, its production today is almost insignificant. In 1969 she produced about 12,000 carats of diamond.

The most important feature of diamond trade is that the large majority of world's diamonds go through the Central Selling Organisation which was evolved by a group of companies in South Africa to control a highly fluctuating market.

Ruby and sapphires are obtained chiefly from Ceylon, Burma and Thailand. Emeralds are worked in Columbia, Siberia and New South Wales. Garnets occur in Saxony,

Bohemia, Burma, Ceylon and the Urals. In India a small quantity of garnets is also raised on a commercial scale in Kodarma in Bihar.

Building Stones :— The most widely-used of all building materials are limestone, traprock, marble, sandstone and slate. The heavy weight and cheap price do not generally permit the working of the building materials far from their markets. *Clay* is used for making bricks, tiles and pottery. *Granite* is found chiefly in England, Sweden, France and Canada. Italy supplies the finest *marble* in the world. Marble is also quarried in England and the U.S.A. *Slate* has a long life, being hard, dense and insoluble in acid. It is chiefly used for roofing, black boards and bulletin boards. Other uses are for table tops, school slates, refrigerator shelves, etc. *Cement* is generally prepared by mixing clay with limestone. When cement is mixed with sand, gravel or crushed stone, the product is "concrete". Cement is extensively used in building roads, houses, streets and also in the construction of bridges, harbours and sea-walls. There are few countries which do not possess limestone and clay for the manufacture of cement.

QUESTIONS

1. Give a brief account of the world distribution of coal, its various uses and by-products. (Delhi, B. Com. 1971).

2. In what conditions may a coal mine be of greater value than a gold mine ? Illustrate your answer with reference to the coal mines of (*a*) Great Britain, (*b*) Germany.

3. Briefly describe the world distribution of coal and iron with special reference to their economic importance.

4. "The discovery of minerals and precious metals has often given great impetus to the development of a country." Discuss this statement with special reference to North America and South Africa.

5. Write short notes on the use of any four of the following minerals and also state the sources of their supply: (*a*) Lead, (*b*) Tin, (*c*) Zinc, (*d*) Copper, (*e*) Manganese and (*f*) Aluminium.
—(Cal. B.Com. 1955).

6. Where are the principal oil-fields of the world located ? Explain the petroleum policy of any of the following countries: Great Britain, France, Germany, U.S.S.R. and Italy.

7. Discuss the importance of mineral oil in modern warfare and industrial development and examine the resources in this respect of the leading world powers.

8. Give a geographical account of the principal oil-fields of the Near East bringing out the political and strategic significance of their situation.

9. Give an account of the distribution of petroleum fields in the world and discuss in this connection the position of the Middle-East.
—(Delhi, B.Com. 1958, 1971)

10. Discuss in detail the geographical factors which are essential for the development of hydro-electric power. Which countries of the world have developed their water power resources and why?
—(Cal. B.Com. 1956 ; Patna, M.A. 1957).

11. Give an account of the world distribution of petroleum and discuss in this connection the position on the oil-fields of the Middle East. —(Cal. Inter 1955).

12. Assess the distribution of petroleum resources in South-West Asia and the Americas, and indicate to what extent they are being exploited currently in each case. —(Delhi, B.Com. 1957).

13. Compare coal, petroleum and water-power as agents in localising manufacturing industries with reference to typical areas.
—(Bihar M.A. 1957).

14. Describe briefly the world distribution of coal. How does it compare with hydro-electricity and petroleum as source of power and also in influencing the location of industries in a country?
—(Delhi, B.Com. 1963 ; 1971)

15. Compare and contrast coal, petroleum and hydro-electricity as sources of industrial power. Examine the natural and economic factors, favouring the production of hydro-electricity. —(Cal. B.Com. 1964).

16. Give a concise geo-economic account of the hydro-electric development in the U.S.A. — (Delhi B.Com. 1965).

17. Discuss the pattern of distribution of coal reserves in the world. How has this pattern influenced the industrial development of individual countries? —(Delhi B.Com. 1968)

18. Describe briefly the relationship between energy consumption and economic development of a country. —(Delhi B.Com. 1971)

CHAPTER V

FISHERIES, ANIMALS AND FORESTS AS RESOURCES

The Fishery Resources[1]

Fisheries mean the capture and the processing of sea, coastal and inland acquatic animals and plants as an occupation for profit. Although this is an old occupation, its importance has increased, of late, tremendously on account of almost saturation point in respect of available arable land for food. The aquatic animals can be divided into three classes: fish, shell-fish and mammals. Experts estimate that there are about 30,000 species of fishes, many of which live only in fresh water, a good number are marine and a few divide their lines in between. Fresh-water fish are found in rivers, lakes, ponds, etc. and are important mainly for local consumption. The sea covers more than seventy per cent of the surface of the earth and is rich in marine resources. The fishing, however, is conducted along the continental shelves which form an extremely small part of the waters. Sea-water fish are important both for local areas and for wider demand outside. Sea-water fish fall into two main divisions—demersal and pelagic. Demersal fish (white fish) live in or near the sea-bed. Pelagic fish live in the intermediate waters or near the surface.

At present in many countries fishing is carried on with the help of drifters and trawlers. These vessels can go very far and are less dependent on weather; so they can handle bigger catches. The modern trawl net is dragged along the bottom of the sea at a rate of two to six miles an hour, and is finally drawn up into the trawler. Drifting is used for fish living at various depths not far below the surface. A steam drifter carries a crew of ten and about 99 nets. These nets are joined together by short-ropes at the top and bottom.

[1] The term fishery includes not only the business of catching fish in ordinary sense but also the taking of shell-fish, whales and other resources of the sea and of inland waters.

FISH LANDINGS IN THE PRINCIPAL COUNTRIES[2]

(In thousand metric tons)

	1956	1963	1967	1969
Canada	1,106	1,191	1,290	1,408
U.S.A.	2,959	2,711	2,384	2,495
Peru	453	—	10,110	9,223
India	1,012	936	1,400	1,605
Japan	4,763	6,697	7,814	8,624
Norway	2,201	1,388	3,214	2,481
U.K.	1,050	951	1,026	1,083
U.S.S.R	2,616	3,977	5,777	6,498
World	29,790	46,400	60,500	63,100

Principal Fishing Grounds

In terms of quantity, Asia occupies the first place with 25 million metric tons of fish catches, which is one-third of the world's total. South America's catches constitute about one-fifth of the world's total. Europe caught 11.2 million metric tons in 1969. Africa and North America caught in the same year about 4 million metric tons of fish each.

The important fishing areas are found within a few hundred miles of the coast. They lie partly on the shore-belt of shallow water which covers the continental shelf or the submerged platform surrounding the continents. Others are located in the elevated parts of the sea floor at some distance from the shore, as the Dogger's Bank in the North Sea. The shallowness of the water permits an abundant growth of small organisms which serve as food for many small animals of the sea. These small animals in turn are eaten up by fish. Again, the refuse materials deposited by rivers in the shallow water near the coast are excellent food for fish. Moreover, shallow water is the best spawning ground for fish. Efforts are being made to develop fishing in the deepest ocean areas as well in view of the increasing demand for fish.

Another particular feature of fishing is that *all the important grounds are confined to the temperate zone.*[3] This is be-

[2] Statistical Year Book, 1970, published by U.N. 1971, New York.

[3] The regions of rich pastures in the ocean are at the meeting places of cold and warm currents and also where the deeper waters of the oceans as a result of tides and currents get oxygenated.

cause the warmth of the tropical water appears to favour the growth of innumerable kinds of fish, including poisonous and inedible varieties. But the physical conditions of the cooler waters of the temperate seas favour the individual abundance of fewer species of fishes, many of which are valuable for human consumption.

Fishing on a commercial and organised scale has not yet developed in tropical waters. Apart from the fact that preservation of fish is difficult, the tropical waters contain innumerable species of fish—edible and poisonous. Commercial classification of fish in such waters is also difficult to make in view of little research made in this regard. However, certain tropical regions of the Atlantic, Pacific and Indian oceans hold out greater promise for fisheries.

There are four principal fishing grounds in the world: (*i*) The North Atlantic coast of Newfoundland, Maritime Canada and New England ; (*ii*) the coast of North-West Europe, (*iii*) the coast of Japan ; (*iv*) the North Pacific coast of North America.

The fisheries of the north-eastern sides of North America are based on a rich combination of rivers, bays and shallow off-shore banks. From New England to Newfoundland, along the coast, herring and halibut are extensively found. Newfoundland and Labrador offer one of the best modern examples of people living from one resource—so great is the dependence upon fish. Two-thirds of the exports are fish products. Fishing is equally important for Nova Scotia. In the North Atlantic coast of North America the chief fishing centres are Boston, Halifax, St. John, Montreal and Portland (Maine).

The deep sea-fisheries are confined to the Grand Banks and the south of Newfoundland.

The North Sea is the largest fishing ground in the world. It is very shallow and abounds with fishing banks. It is surrounded by populous countries like Great Britain, Norway, Holland, Germany, France, Denmark and Belgium. Each of these countries takes an active part in the fishing industry.

It is the sixth biggest industry in the U.K., where about 24,000 fishermen are in regular employment. It is the leading country both for the import and export of fish. South-East

England and the coastal towns of Northern Scotland are the fishing centres. Wick, Thurso, Fraserburg, Peterhead and Aberdeen are the important fishing centres of Northern Scotland. In Eastern England, the important fishing centres are Hull, Grimsby, Yarmouth and Lowestoft. Here large quantities of herring are packed in salt and dried for export to the Continent. Fifty per cent of the total catch of Britain is herring. Britain's fishing industry falls into two main divisions—demersal and pelagic. Demersal fish live on or near the sea-bed (*e.g.* cod, haddock, sole, turbot etc.) while pelagic fish are found in the intermediate waters or near the surface (*e.g.* herring, pilchard, mackerel etc.) In the west coast of Britain, the lake fisheries are the most important. Grimsby, Lowestoft, Fleetwood and Milford are the leading ports. The greatest fish market is Billingsgate in the city of London. In 1970, Britain had a production of 7 million tons of fish. Although large quantities of fish are caught in the U.K., the country also imports annually a considerable quantity.

Norway furnishes one of the finest examples of the close relation between geographical conditions and the fishing industry. Numerous harbours, invigorating climate and paucity of agricultural land have compelled the Norwegians to look to the sea as an instrument of their prosperity and progress. About 50,000 persons are engaged in the fisheries. The important fishing grounds are confined to the south of the Lofoten islands where large numbers of cod and herring are caught. Cod is caught in Hammerfest and Tromso. Trondheim and Bergen are the centres of herring fisheries. Norway supplies over 50 per cent of the whale oil of the world. Fish accounts for one-third of the total value of export from Norway.

The coastal waters consisting of cold and warm currents around Japan constitute one of the major fishing grounds of the world. The geographical advantage of location in the Northern Pacific area, the modernised management of fisheries and the rapid formation of domestic markets have made Japan one of the leading countries in fisheries. The fisheries are important in the cool seas around the north of Honshiu, Hokkaido and Karafuto. Many varieties of fish are found because of the cold and warm currents washing the west and the east coasts respectively. The Japanese fishermen go as far as the

Kurile Islands and Kamchatka peninsula in the north-eastern Pacific. Japan introduced modern fishing techniques in 1910 and by 1930 became the world's top fishing nation. Till 1939, Japan accounted for one-half to two-thirds of the world's total fishing. Although production dropped considerably during and immediately after the World War II, it reached the pre-war level by 1952 and in 1958 it was again the leading fishing nation with more than 16 p.c. of the World's total. In 1969, the

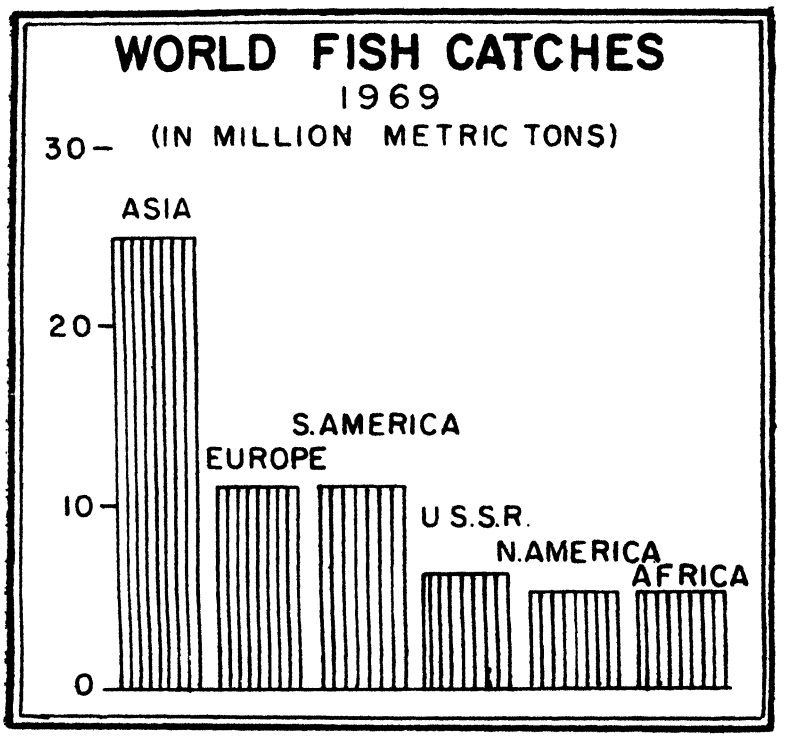


FIG. No. 37. World Fish Catches

production was 8.6 million tons excluding deep-sea fishing and whaling. The whaling industry has expanded considerably in recent years. About 3,300 whales were caught in 1967 from the Japanese region. In 1968 there were more than 450,000 fishing boats of which 300,000 were powered by engines. It is significant to note that about 80 p.c. of boats which are run by engines were constructed after 1948.

Japan consumes more fish than any other country in the orld, and the average annual value of Japan's fisheries is reater than that of any other country. Exports of fish to foreign ountries are not proportionately large, for the major portion f the catches is consumed in the country. The number of shing ports in Japan totals more than 2,700, of which 2,269 re used as bases for coastal fishing. There are 78 fishing ports hich serve as bases for deep-sea fishing and off-shore fishing. early 80 per cent of the total catch of fish in Japan is obtained om the coasts of Hokkaido, Korea, Kurile Islands and Sakha-n. Cod, herring, mackerel, salmon and crab are caught in ie west coast, while in the east coast the chief catches are onits, tunny and turtle. Cultured pearls are produced now-days in Japan by breeding oysters and inserting in them rains of sand around which pearls are formed. Such pearls re suitable for jewellery.

The fishing area on the North Pacific Coast of North merica extends from the Gulf of Alaska to the North Cali-ornian Coast. Though the region is sparsely populated, the shing industry has developed greatly. Salmon fisheries are of ie greatest value to Alaska which annually produces more ian three-fifths of the enormous salmon catch of the Pacific merica. The fjords and skerry coast of British Columbia make t an ideal fishing ground. The Fraser River, Skeena River and he waters about Queen Charlotte Island abound with salmon ish. Herring, cod and halibut are also caught for export. ardines are caught off the Californian coast. The important shing centres are Victoria, Sitka, Vancouver, Prince Rupert sland, and Portland.

Peru in South America has had a meteoric rise as a fish-catching nation, and it occupies the first place in the world. The bulk of the fish caught is anchovete, abounding in the Humbolt current just off the coast, and most of it is turned into meal and oil. The principal customers are West Germany, Netherlands, U.K. and U.S.A. Peru is the world's largest ex-porter of fish meal.

China is ranked as the fourth largest producer with a catch of about 5 million tons a year, and the entire production is consumed in the country. Soviet Union with more than 6.4 million tons a year is a large producer.

Fish is caught in many other regions. Along the north and eastern coasts of Australia, the coasts of Indonesia and the Mediterranean coasts, fish is caught and consumed. Riven fish is important for local consumption. The rivers of Russia, Central Europe, North America, India and China provide large quantities of fish.

Present Position

In 1969 the world fish catch reached the record level of 63 million metric tons. Asia's share in the catch represented 35 p.c. of the total. Well over half the world's fish comes From Northern hemisphere waters. Southern hemisphere areas account for about 24 p.c. of ocean caught total. Fresh water fish provides hardly 11 p.c. of the world catch. The largest group by species that are caught consists of herring, sardines and anchovete types of fish and account for more than 33 p.c. of the world catch. The next largest group consists of cods, hakes and haddocks.

As fishes are to be exported to distant markets including tropical countries, the need for their preservation is a serious consideration of the fishing countries. Herring, salmon and tuna are canned to permit their durability even in hot climates. Herring and cod are also salted before export. Whale and seal are non-edible and, of course, no fish but mammals. Their chief commercial value lies in the oil obtained from their fat. Whale is generally found in the Arctic waters between Norwa and Newfoundland. It is also caught in the Ross Sea in th Southern Hemisphere. Seal oil is used for soap-making. T skins are tanned and used for various kinds of leather good As the seals are found in the Arctic waters, the hunting really very dangerous. Newfoundland, Norway and Russia a the leading countries in respect of seal-hunting.

Because of the increasing demand for oils and fats in th world, there is a growing tendency in most countries to depe more and more on sea than on land as a source of edible oil The total marine oil production in 1968 was 1 million to compared to total oil and fat supply of 40 million tons. B big developments are taking place in South Africa, Peru a

hile, in addition to Iceland, Norway and Denmark to increase his production.

Mention may be made of pearl fisheries which are in eylon, the Persian Gulf, Sulu Archipelago, off New Guinea, ff some parts of the Australian coast and amongst some of he Polynesian islands. The value of a pearl depends upon its ize, shape, colour, brightness and freedom from defects. The nost valuable pearls are those which are perfectly round ; the utton-shaped ranks next, and then come the pear-shaped earls.

Exploitation and Conservation

Although fish resources are automatically renewable on a ustained-yield basis, there are definite signs of depletion. The od production in the North Atlantic, lobster in New England vaters, white fish in Lake Huron in the U.S.A., pilchard in he Pacific coast and salmon in the Atlantic coast are being aught less in number in recent years. There is need for explor- ng new grounds along the Southern shores of Africa, Australia nd South America. In the case of fresh-water fish, the deple- ion comes through pollution of waters by sewage and industrial vastes, through silts carried into streams and through drainage f lands for agriculture. With more knowledge about beha- iour of fish and their life, positive devices can be introduced o increase the productivity of fish resources.

Animals as a Source of Food and Raw Materials[4]

All over the world, animals are domesticated for food, transport, clothing and also for raw materials other than those for clothing. The important domestic animals are cattle, sheep, pig, horse, ass, camel, goat and elephant. Since animals re- quire a large area in which to roam and feed, the livestock of the world is found in those countries where conditions are favourable for its growth. In densely populated countries or

[4] The statistics are based on Production Year Book 1970 of F.A.O. (1971), New York ; Statistical Year Book 1970 of United Nations, 1971.

in mountainous areas, it is difficult to develop such an occupation.

LIVESTOCK POPULATION IN THE WORLD

(in million heads)

	1948-52	1969		1948-52	1969
Pigs ...	295	600	Horses ...	77	69
Sheep ...	779	1,078	Mules ...	12	16
Goats ...	284	385	Asses ...	37	43
Cattle ...	787	1,279	Buffaloes ...	87	119
			Camels ...	10	12

Continent-wise, Asia has the largest number of cattle (274 millions) and buffaloes (87 millions); Australia and New Zealand dominate in sheep (224 millions), and South America in horses (17 millions) and mules (6 millions).

Animals as a Source of Food

Animals supply food in meat and dairy produce. Meat animals are cattle, sheep, goats and pigs. Formerly meat animals were raised near the markets, but today, thanks to the introduction of refrigeration and improved means of communication, markets which are thousands of miles away from the pasture lands can be supplied with fresh meat. Meat can also be preserved in air-tight vessels. U.S.A., South America and Australia have developed the meat-canning industry to a great extent. Argentina holds the leading position in the meat trade of the world. The conditions favourable to Argentina are its vast grassy level plain and the nearness of the cattle-lands to the sea-board. In 1969, Argentina contributed 3 million metric tons, U.S.A. 16 million metric tons, U.S.S.R. 12 million tons, West Germany 3.4 million tons and Australia 2 million tons of meat (beef, veal, pork, mutton and lamb).

Sheep are found practically in all the continents and are bred for wool and mutton. Mutton sheep are best raised in England. Large quantities of mutton come from Australia, New Zealand, South Africa and Uruguay.

Pigs are found in every part of the habitable globe as they readily adapted to a new environment. They are easily nesticated, and are reared in large numbers in China, the .A., the countries of Western Europe, Argentina and Brazil. nia has more than one-third of the world's total pigs. The nual increase of pigs in China is to the extent of 20 millions. e U.S.A. is also a large producer of pigs. The maize districts Iowa, Illinois, Indiana, Ohio, Kansas and Nebraska raise re than one-half of the U.S.A.'s total supply. Chicago, Kansas , Omaha and Milwaukee are main centres for *pork king and bacon curing*. Lard (fat from pigs) is also exported m the U.S.A.

Germany, Netherlands, Denmark, Spain and Portugal are important pig-raising areas in Europe.

Since the pig is a prolific breeder, it is very important a source of meat supply in countries of dense population. nerally speaking, the presence of a large number of pigs in ountry shows that "the pressure of population is taxing the ources of the land so that it must be used more economical- ' About 2.6 million pigs are exported annually, and China ne sends 1 million pigs. The next important supplier is land.

Cattle and Food Supply

No other animal has a greater place of importance than ttle in the progress of nations, because highest physical and ntal development needs diets based on dairy. Cattle is vided into two groups: dairy cattle and beef cattle. Breeds cattle are developed to produce either milk or beef with ciency. A cow can produce 20 times her body weight in ilk in one year, but this means attention to breeding, pre- ntion of disease and other improved methods. The World's ttle population is a little more than 1100 million, of which out 108 million are in U.S.A., 180 million in India, 90 mil- in Brazil, and 21 million in France. Beef cattle are world- de in distribution and production. Argentina, Brazil, Colom- a, Uruguay, Paraguay, Mexico, Canada, Australia and U.S.A. roduce more than their domestic needs. Continent-wise, how- er, Europe is the leading exporter of bovine cattle.

In respect of export of bovine cattle, Mexico occupies the first position followed by Ireland and Canada.

Dairying is an industry which depends on climate and selection of cattle for milk and butterfat. Dairying has developed in lands of moderate coolness where rainfall is sufficient for the heavy growth of grass and other forage required by cattle. The winter in such lands is mild and therefore indoor stabling and feeding of cattle is not necessary. U.S.A. and North-Western Europe are the two important areas devoted to dairying. Milk, butter and cheese are the main produce. In the U.S.A. the leading areas are Wisconsin and Illinois. More than 20 million cows are reared in the dairy farms of the U.S.A.[4]

In Europe, the low countries of the north-western section have rich pastures. Denmark is the pre-eminent dairy-farming country in the world. Denmark's success in dairying depends on co-operative societies. At present there are nearly 9,000 societies in the country. Eighty per cent of the milk is used for making butter, ten per cent for cheese and condensed milk and the rest is consumed locally. The dairy produce amounts to 76 per cent of the value of Danish exports. Netherlands is also famous for dairy produce. The other countries are Switzerland, France, Sweden, Ireland, Germany and Finland.

New Zealand is one of the leading dairy countries in the British Commonwealth. The Government always takes an active interest in farming. The butter and cheese of New Zealand have wide markets. The total number of dairy cows in 1967 was 7 million and the butter-fat production was 215,000 metric tons in the same year.

The world production of milk is about 395 million tons a year of which 363 million tons are obtained from cows, 19 million tons from buffalo (in India) and 6 million tons each from sheep and goats. The largest producer is the U.S.A. with more than 66 million tons.[5]

There is considerable international trade in dairy products like milk, butter and cheese. Milk is put in markets in various

[4] Cow supplies 98 p.c. of the milk supply in Europe, North America, South America and Australia. In Asia, buffalo supplied 48 p.c. of the milk supply.

forms—fresh, condensed and dried. Of the total volume of milk exports, Europe accounts for two-third.

EXPORT OF MILK, 1969

(In 1000 metric tons)

Netherlands	... 357	Belgium	... 93
France	... 399	Denmark	... 72
U.K.	... 45	Germany (W)	... 100
Canada	... 72	World Total	... 1,187
U.S.A.	... 149		
Australia	.. 78		

Europe imports more than one-fourth of the world's total export of milk and cream. Netherlands, France, Belgium, West Germany and U.K. are the main importers. U.S.A. imports a very small quantity.

Although India leads in cattle production, her share in the export dairying is nil. This is because her production is still inadequate for internal demand. The average consumption of milk per head per day either in the liquid form or as milk products does not exceed 7 ounces in India compared to 56 in New Zealand, 40 Denmark, 61 Sweden, 45 Australia, 35 Canada, 35 U.S.A., 30 France, 35 Netherlands and 39 Great Britain. Butter is produced in many countries but only a few are in a position to export it, because of internal demand. The principal exporters of butter are Australia, New Zealand, Netherlands, Denmark and Poland. The leading producers of cheese are U.S.A., Argentina, France, Germany, Netherlands and New Zealand. U.K. is the leading importer of butter in the world, and consumes about $\frac{1}{3}$ of world's total. It is interesting that western Europe is he largest exporter as well as importer of butter.

The largest production of cheese in 1969 came from U.S.A. with 1200,000 metric tons, followed by U.S.S.R. 908,000, France 700, Italy 500, Germany (West) 400, Netherlands 300, Argentina

190 and New Zealand 98 thousand metric tons. About 86 p.c. of world's exports of cheese move from Europe. The total exports of cheese in 1969 was 670,000 and of this Europe sent 517,000 tons. Netherlands alone handles 25 p.c. of the world's export. Europe is also the largest importer of cheese, taking as much as 90 p.c. of the world's total.

Animals as a Source of Raw Materials

Wool is an important animal product and holds a high place amongst textile materials. Camel, sheep and goat supply nearly 90 per cent of the world's total wool. So far as material for clothing is concerned, no animal can compete with sheep. New Zealand, Australia, South Africa, Uruguay, India and the U.S.S.R. are large producers of sheep. There are a little more than 1078 million sheep in the world, distributed unequally. About one-fifth of the sheep is found in Australia, followed by New Zealand (60 million), Argentina (49 million), South Africa (36 million), Turkey (34 million), U.S.A. (24 million), and India (42 million). Sheep yielding the best wool require a dry, warm, temperate climate and limestone soil. The best wool-producing sheep is 'Merino'. The great wool-producing areas are found in the thinly populated grasslands. Australia is the biggest wool producer and supplies more than one-third of the world's total wool production. The main sheep-belt lies on the leeward side of the Eastern Highlands, stretching from the Murray basin northward to Central Queensland. New South Wales has more than half of Australia's sheep. The east coast lands have a damp climate and therefore sheep are few there. Other areas in Australia are Queensland (20 p.c.), Victoria (15 p.c.), and West Australia (10 p.c.). The important wool collecting centres are Sydney, Albury, Melbourne, Geelong, Ballarat and Brisbane.

Next in degree of importance is U.S.S.R. with 395,000 metric tons (1968). In New Zealand the dry slopes and plains on the coastal sides of the South Islands maintain large flocks of sheep. The rich character of the country's pasture land is indicated by the fact that it supports 60 million sheep.

The production of wool on greasy basis in 1969 was 2.7 million metric tons of which Australia contributed 927,000 tons and U.S.S.R. 390,000 metric tons. New Zealand raised about 330,000 metric tons. The production of wool in South America is a little less than that of U.S.S.R. Although the world production of wool has increased since 1950 by more than 100 p.c., the main contributors are still Australia and New Zealand. In the developing countries, slower technical progress in breeding and rearing sheep and less efficient methods of grading and marketing with continued high costs have been responsible for little expansion. The unsuitable climatic conditions and low income of consumers in these countries do not permit expansion of domestic use of wool.

Wool can be divided into two classes—apparel wool and carpet wool. Apparel wool is produced in Australia, Argentina, New Zealand, South Africa, Uruguay, U.S.A., and U.K. while U.S.S.R., China and India produce carpet wool.

Trade in Wool

The world trade in wool is dominated by the countries of the southern hemisphere. The four countries of the southern continents—Australia, New Zealand, Argentina and Uruguay supply about 75 p.c. of the world's trade in wool. Although Soviet Union is the second largest wool producer, it does not export because of the increasing demand within the country. Australia sells about 83 p.c. of its wool production, South Africa a little less than 80 p.c. and New Zealand and Argentina above 90 p.c. These countries of the Southern hemisphere have not developed woollen industry as the export of raw wool is found to be more secure economically. Also, these countries have attained the requisite kind of industrial sophistication much later than other advanced countries which had already captured much of the international markets. Further, the internal markets are not sufficiently large to support the woollen industry. India exports about 14,000 tons of raw wool, which is about 1 p.c. of the world's total export. The principal importing countries are Japan, U.K., France, Italy, Belgium, Germany (W), and the U.S.A., which have developed large export trade in manufactured wool. U.K. is the largest importer.

EXPORTERS OF WOOL, 1969

(In Thousand metric tons)

Europe	92	Asia	29
France	39	India	8
South America	140	Pakistan	11
Argentina	101	Australia	736
Uruguay	38	New Zealand	324
South Africa	117	World	1,438

The present world consumption of wool has gone up by 10 to 15 per cent above the pre-war years and the industry retains about 10 p.c. share of the expanding world textile market. The main problem is the shortage of wool fibres. Higher prices of wool often forces customers to look for synthetic wool. Research has been undertaken in New Zealand, Australia, South Africa and U.S.A. to study the medium and coarse wool fibre with a view to increasing their usefulness. Virgin wool is being competed by man-made fibres and other materials. In U.S.A. its consumption in the woollen industry has come down from 62 p.c. in 1952 to 30 p.c. after 1960. In U.S.A., the consumption of man-made fibre in the woollen industry has gone up to 36 p.c. from 10 p.c. In Europe, however, the use of virgin wool in the woollen textile industry has remained more or less constant. Unless wool production is increased and cost reduced, the appeal of synthetic fibres will become stronger. Japan has already switched on to substitution on a large scale.[6]

Camel gives hair from its mane and hump. Camel-wool is important in Iran, Arabia, Asia Minor, North Africa and Central Asia. Other important wool-producing animals are the *Angora goat, the Tibetan goat, the Alpaca and the Llama.* The Angora goat from South Africa supplies 'mohair' wool. The Tibetan, a native of Tibet, Kashmir and Southern China is important for its soft wool which is made into 'Kashmere'

[6] It must however be conceded that man-made fibre has the constant problem of creating demand in order to expand output and profit. The buyers are to be convinced every time a new type is introduced that the man-made fibre has all the advantages of natural wool without the latter's defects like shrinkage of wool or attraction to moths.

hawls. Peru and Bolivia rear the Alpaca from which the wool alpaca' is obtained. *Alpaca* is used for linings, braids and

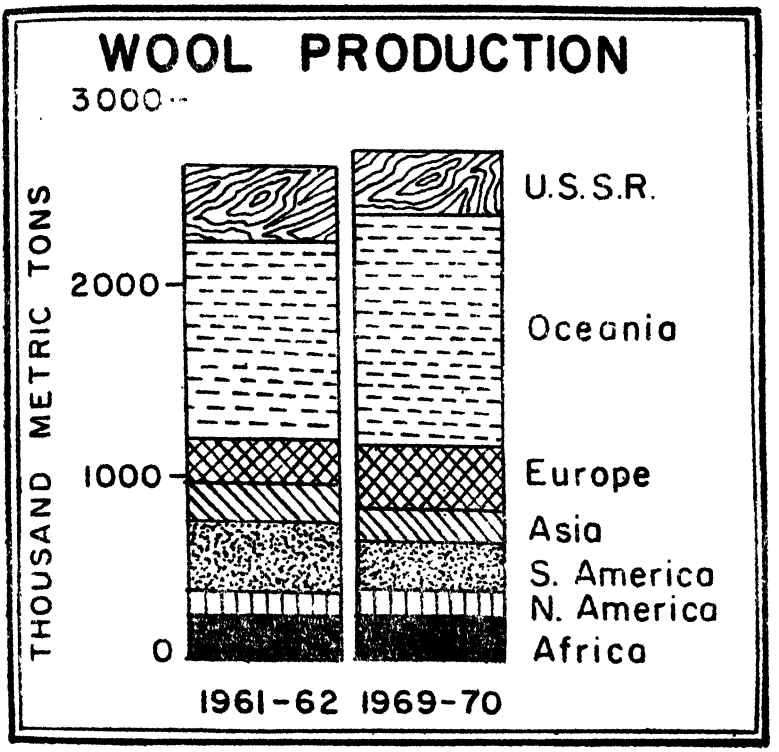


FIG. NO. 38. Wool Production

light cloths. The Llama, a native of Peru, yields a wool equal in quality to Alpaca.

Some By-products of Animals

The by-products of the animal industry are of great importance. These are bones, horns, hides, fat, hoofs etc. Bones are useful for making buttons, combs, toilet articles and the like. Leather is of great importance to men. Not only are boots and shoes made of it, but also bags, suitcases, trunks, harnesses, chairs, machine-belts, automobile seats, cases for guns and sundry other things. The most valuable supply of leather materials comes from cattle, horses, sheep and goats.

Argentina, Uruguay, Central America, Russia, Canada and South Africa supply cattle-hides. Germany and the U.S.A. are the leaders in tanning industry (cattle-hide). More than 70 per cent of the U.S.A.'s leather production is accounted for by cattle-hides. Goat-skins are important in India, China, Spain and Brazil. Great Britain is the world's leading exporter of leather goods and sells about 20 per cent of its output abroad. The leather market in the world is a shrinking one, and the completion from man-made materials is very keen. For almost every use to which leather is put, there is now a good man-made substitute. Glass fibre has ousted leather from luggage products in the western countries. In shoe trade, however, the leather still dominates, though here too plastics and rubber are making their presence felt.

The animal products are mostly raised in those areas where the meat-packing industry is important. Furs are obtained from fox, mink, squirrel and ermine of the cool temperate lands.

Animal health is key to higher output—Whether for meat or for wool, the animals must be free from disease. Disease among farm animals is still a continuous source of losses in all major livestock keeping countries. There is need to break down the barrier between veterinary and stock raising management.

FOREST RESOURCES AND FORESTRY

The importance of a forest lies in its capacity to meet a large number of human wants. Its earliest recognition came from the desire of men to have shelter for protection from dangers of many kinds and from inclemencies of the weather. Forests supplied men with wood to make weapons, to have fire and to build houses. Now, it has become of universal use not only for fuel and houses, but for thousands of purposes in construction and as raw materials for many industries. In a very real sense, the present civilisation has a wood base.

Although one-fourth of the land surface of the earth is covered by forests, its distribution is very unequal in the six continents, because of climate and also because mankind has cleared forests from many areas for agricultural lands, and other purposes.

Forest lands are divided into two classes: Commercial and non-commercial. Commercial forest land is forest land which gives products, while non-commercial is that which is not suitable or available for products.

Forest—A Multipurpose Resource

Although every country makes uses of forest resources in direct or indirect forms for its economy, there are some which depend to a substantial degree on their forest resources. These countries are Canada, Sweden, Finland and U.S.S.R.

Forests have direct and indirect uses.

The indirect uses are the following:—(*i*) Forests render the climate more equable and contribute to increased rainfall. (*ii*) They increase the fertility of the soil. Forests are effective agents in the conservation of soil and moisture. By preventing rapid run-off by promoting percolation of rain water and by the binding effects of the roots on the soil, forests exercise a protective effect on the soil, on steep hill slopes where the danger of fluvial soil erosion is also the greatest. They similarly exercise a beneficial protective function against desiccation and erosion caused by winds on flat country. (*iii*) They decrease the velocity of the air-currents.

The direct uses of forests relate chiefly to their produce, such as timber and firewood, and the raw materials they afford for various industries. Timber is used for making boxes, crating, house-building materials, furniture, masts and decks of ships, etc. The pulp produced from wood is the most important raw material for the manufacture of paper and rayon. The other uses of timber are those of distillation, dye-stuffs, fence posts etc. Various forest products are rubber, gutta-percha, quinine, tar, turpentine, resin, cork, etc. The other important uses of forests are for the grazing of cattle, and for public recreation. They also afford to the villagers who live nearby a ready supply of materials for house-building, fuel, and minor forest products which add to the comforts of their lives.

In terms of weight, wood is now second after coal among all raw materials produced in the world. Seven countries—Canada, U.S.A., Soviet Union, Sweden, Finland and Japan produce

about 75 p.c. of the world's lumber. North America, Oceania and Europe which contain about 24 p.c. of the world population, consume more than 70 p.c. of the total industrial wood and the remaining 76 p.c. of the world's population consume less than 30 p.c.

These benefits of forests can be everlasting if forest lands are scientifically managed. Forestry is the scientific management of forest lands for a continuous supply of products and services which men can obtain from them.

Forests can be managed on multiple-use principle in which forests are made to yield different benefits as are consistent with national inerest. A forest is, therefore, a multi-purpose resource like a river system.

Types of Forest

There are three main classes of forests: (*i*) Coniferous soft wood, (*ii*) Temperate hard wood or Deciduous, (*iii*) Tropical hard wood or Evergreen.

Coniferous soft wood[7] consists of pine, firs, spruces, larches, cypresses and junipers. One-half of all the world's wood is today cut from the coniferous forests which are most widespread in cold, snowy regions like Siberia and Canada. The slopes of the Himalayas at an altitude of 5000 to 7000 ft. around Kashmir, certain remote mountains in Western China near the Tibetan border, the Andean slopes of Southern Chile and New Zealand have many coniferous trees. The pine is the most important soft wood and is the chief timber for commercial purposes. It is used for the masts and decks of ships, for the cases and boxes and in the manufacture of matches. It is obtained mostly from the forests of Canada, Norway, and Sweden; it is also cut in the east of the U.S.A., in Tasmania and in New Zealand. Pulp timbers from soft wood are extensively used for the manufacture of paper, especially for newsprint. All important paper-making countries have local supplies of soft wood.

[7] A soft wood is a needle-leaved tree which may be evergreen like the pines or deciduous like the Tamarack or bald cypress.

The temperate hard wood or deciduous woods like oak, birch, beech, maple, ash, walnut and elm are mostly used in the manufacture of furniture.[8] In the world as a whole, the temperate hard wood furnishes 40 per cent of the total cut and is found best in the Alps, the Pyrenees, Central Russia, the middle region of Siberia, Japan, the Appalachian region in the U.S.A., Patagonia and Southern Chile.

Tropical hard wood or evergreen forests include teak, mahogany, ebony, rose wood and dye wood. The three great regions are the forests of the Amazon, known as Selvas in South America, the forests of the Congo basin and the Upper Guinea Coast-lands of Africa, and the forests of Indonesia. The tropical forests contain cabinet timber and dye woods. The chief varieties used for making the best furniture are mahogany, ebony and rose wood which are mainly found in Central America and West Indies. The best quality mahogany is found in Haiti, and the inferior types come from Cuba, Jamaica and Mexico.

One of the serious problems in respect of movement of timber from one country to another is its high cost of handling at ports. Substantial savings can be made in transport cost if new ships designed for the trade using "container-type" methods and port handling are developed. The timber trade today relies upon tramp vessels most of which are small in size and do not carry more than 650 tons each. The timber transport from Western Canada is depending on special timber berths or terminals for the bulk carriers. There is, therefore, need of container-style operations to carry container-style packages of timber instead of "jumbled length" packages in traditional ships.

U.K. is the world's biggest single importer of timber despite the fact that there has been a big increase in home grown timber production. U.K. imported 1 million cubic metres in 1970. The main sources are West Africa (50 p.c.), Far East (25 p.c.) and Europe (20 p.c.).

[8] A hard wood tree, whether it produces a wood of peculiar hardness or not, is a broad-leaved tree.

ESTIMATED PRODUCTION OF ROUND WOOD[9]

		1948	1958	1965	1969
U.S.A.	...	280	293	228	336
Canada	...	86	92	113	112
U.S.S.R.	...	250	351	378	380
Japan	...	39	75	59	54
France	...	32	42	40	32
Sweden	...	38	45	44	53
World	...	1,380	1,794	2,011	2,185

Forest Regions

Europe : Nearly one-third of Europe is forest-covered. The continent produces 10 per cent of the world's total supply of forests. *Scandinavia, Finland, the Baltic regions and Northern Russia* are covered with coniferous forests. The lumbering and timber industries in these countries have developed to a great extent because rivers provide easy transport and cheap mechanical power. These regions are Europe's major exporters of wood products such as lumber, ties, mine props, pulp wood and other products. In central and western Europe, the forests are man-made. Land which is too rough or too elevated for profitable agricultural is planted to trees. In 1969 Europe produced 316 million cubic metres of coniferous wood and 138 million cubic metres of broad leaved wood.

Sweden is the most important timber-producing country in Europe. Nearly 56 per cent of the total land area is covered with forests. The total amount of wood is estimated at 2,100 million cubic metres. Sweden has an annual output of about 54 million cu. metres solid volume, of which coniferous timber is 40 per cent and pulp wood 60 per cent. Window frames, paper, matches, wood pulp and plywood form nearly 40 per cent of Swedish exports. In *Norway* the forests which are one of the chief natural sources of wealth cover nearly one-fourth of the total area. About 81 per cent are pine trees. The forest products constitute about one-third of the total exports. Norway does not supply much wood to other countries but uses it as the basis of manufacturing industries, such as the

[9] U.N. Statistical Year Book 1970 published in 1971.

manufacture of pulp, newsprint, cellulose, cardboard, matches and paper. "Beyond the home consumption of timber and fuel wood, the essential part of the growth is consumed as raw material in the paper industry, most of which is exported". As the coast of Norway is ice-free throughout the year, shipping is least inconvenient for the transport of timber products.

In *Soviet Russia* more than one-third of the total land is covered by forest. There are vast resources of pine, fir, larch and spruce which are used for timber, paper making and the manufacture of cellulose. The largest forest areas are 515 m. hectares in the Asiatic parts of U.S.S.R., 15 m. along the northern sea board, 25 m. in the Urals and 18 m in the north-west. The average annual increase of exploitable timber in North Russia is about 51 m. cu. metres, of which 40 to 45 m. cu. metres are exploited. The Urals have the same average increase. Siberia utilises approximately 70 m. cu. metres a year. The magnitude of the industry can be judged from the fact that while Soviet Russia produces about 380 million cubic metres of round wood, Canada raises only a little more than 100 million cubic metres of round wood.

North America : Nearly twenty per cent of the world's forest areas are confined to North America. *Canada* is known as the *storehouse of soft wood supplies in the Commonwealth countries.* Her output of timber is greater than the combined production of the next five leading producing countries. British Columbia, Northern Prairie provinces, Ontario, Quebec and New Brunswick have developed lumber industry. The Canadian forest industries, in order to offset depletion of the forest lands, have adopted modern planning methods, and undertaken reforestation schemes. Canada is the second largest producer of paper with about 110 pulp and paper mills. The manufacture of pulp and paper has been one of the major reasons for the huge development of water power in Canada. Forest land occupies about one-third of the United States. There are more than 1182 different kinds of trees in the American forests. Of these about 150 have commercial value, and more than 50 are widely used in the production of lumber, plywood and woodpulp. These include douglas fir, Southern pine, oak, hemlock, gum, maple, spruce and cypress. There are six broad

forest regions in the United States: (*a*) the Northern forest region from New England state to Georgia through Appalachian mountains for white pine, (*b*) Central hardwood forest region from Connecticut westward to south for hardwood lumber production, (*c*) Southern forest region for timber, (*d*) Tropical forest region including Eastern Florida and coastal Texas with no commercial significances, (*e*) Rocky mountain forest region as conserver of water, and (*f*) Pacific coast forest region for coniferous species.

The annual timber cut amounts to about 110 million cubic metres compared to annual growth of 142 million cubic metres. As fire takes a heavy annual toll in the forests, fire protection service has been organised on a large scale.

Asia : Asia possesses 28 per cent of the world's forest. *Siberia* is covered with coniferous forests, but the difficulties of working them as a result of climate and inadequate means of communication are responsible for the slow development of lumbering industry there. Japan, China and India are also liberally gifted with forests.

Forests of India, Pakistan and Bangladesh

India is very rich in forests, which cover more than one fifth of the total area of the country.[10] There are about 700,000 sq. km of forests in India of which about 400,000 sq. km are considered commonly exploitable.

Broadly speaking, there are four types of forests in India:

(*i*) Deciduous forests, extending over large areas in the sub-Himalayan tract and Peninsular India.

(*ii*) Evergreen forests, occurring in those areas where the rainfall is heavy. Such regions are the west coast of the Peninsula and the eastern sub-Himalayan tract.

(*iii*) Hill forests, varying according to elevation and rainfall. In the Eastern Himalayas and Assam the forests are full of oak and magnolia, while in Assam pine trees grow abundantly at an elevation of 3,000 to 6,000 feet.

[10] There is a proposal that the area under forests in India should be steadily raised to 33 p.c. of the total land area.

(*iv*) Littoral forests, *i.e.*, forests on the sea-coast, the most characteristic tree of which belong to the mangrove family.

Almost all the forests in India are located in the hills. The obstacles to development and present utilization are mainly two-fold: question of species and transportation. There are so many species of trees in India, that a proper classification of timber thereof is a big task, demanding proper survey of the forest areas. Since most of the forest areas are in the mountains, the problem of transport is a serious one, for, as yet the roads and railways are inadequate there.

India produces about 23 million cubic metres of timber annually. Madhya Pradesh contributes one-fourth of the total. The consumption of industrial wood in India is only about 25 lb. per person per year compared to 1000 lb per person in Europe and 2500 lb. in the U.S.A.

Pakistan has arid country forests, extending over Sind, part of Baluchistan and the south of the West Punjab. The forests cover about 1,442 square miles of area.

Bangladesh has 8,558 square miles of forests. The forest products of Bangladesh are timber, bamboos, resin, gum and honey.

Some Problems of Forestry

Main emphasis on forests for a particular benefit or benefits does not allow always the other benefits to continue. The use of lumber in modern construction is universal, and this has led to enormous development of lumbering industry.[11] "At present the amount of timber cut annually in the world is on an average 50 per cent greater than the growth of young trees". In Europe and America, the conservation of forests is practised, that is to say, only mature trees are cut: young and seed trees are allowed to grow. In *Canada,* the policy of the Government is to encourage the "cultivation" of timber for the obvious reason that saw-mills and paper-mills cannot rely on "forest-trees".

[11] One can hardly find a house where wood is not used in one form or another. The use of steel, concrete and plastic materials has no doubt gone up, and to a certain extent reduced the demand for wood, but nevertheless its demand is on the increase in less developed countries.

Although the consumption exceeds the growth, it is assuring to note that there are great reserves in South America, Australia, Africa and South-Eastern Asia. In these areas, the forests grow rapidly because of the climatic conditions. Although forests cover only four per cent of the total area of Australia, its timber has acquired a world-wide fame for high quality and usefulness. More than 75 per cent of the timber comes from genus eucalyptus, which is also used for paper-making, the manufacture of hard board and fibre board. The tropical rain forests of the Queensland coast have hard woods like red cedar, maple, walnut, silky oak and rose wood. Australian pines grow in New South Wales and Tasmania. But the poor transportation facilities in these areas have made the exploitation of the forest products somewhat slow and halting. A complete survey of world's forest resources has never been possible, but such measurements as have been made indicate that the standing timber covers an area of about thrice the size of North America.

If forests are to maintain their productivity, the depleting forces like fire, insects, disease, overgrazing, overcutting and waste in utilization are to be held in check. Forest productivity can be increased through silviculture, which means "the growing of timber as a crop, with the objectives of large yields of good quality, efficient harvesting and quick and adequate reforestation after removal of the mature timber". In fact, silviculture has now become a specialised field.

QUESTIONS

1. What are the principal forest regions of the tropical zone ? Describe their commercial importance.
2. What are the uses of forests ? Describe the different kinds of forests that one comes across while going from the Equator to the North Pole. Mention the products of commercial importance in each. (Indian Institute of Bankers, 1967).
3. Describe the forest regions of the temperate zone. Discuss in this connection the importance of forest-products of Scandinavia and the Baltic States.
4. In which countries of the world is the economy dependent to an appreciable degree, on forest resources ? Make a comparative study of the forest resources of these countries. —(Delhi B.Com. 1968)
5. Describe the distribution and economic uses of coniferous forests of the world. —(Cal. Inter., 1955).
6 "The forest is a national resource ; like a river-system, it is a multi-purpose resource." Explain the nature and extent of forest utilisation in Europe and North America. —(Patna M.A., 1957).

7. Give an account of the principal types of forests and their world distribution. Indicate the relationship between the climate and the development of forests. —(Cal. Inter., 1957)

8. Mention the regions of soft wood forests in the world and explain the geographical factors determining the location of paper industry. —(Delhi B.Com. 1960).

9. Examine the physical conditions that are the characteristics of the great fishing grounds. Illustrate your answer by examples. —(Cal. B.Com. 1953).

10. Write a short essay on the fishing industry of Japan or Norway.

11. Account for the location of the fishing grounds of the world and indicate their chief markets. Give a comparative idea of their total catch. —(Cal. B.Com. 1956).

12. Describe briefly the principal fishing areas of the world and account for the rapid growth of modern fishing along the shores of Japan. —(Delhi B.Com. 1971).

13. Give a geographical account of the commercial fisheries in the high-middle latitudes of the Northern hemisphere. —(Patna University, M.A. 1956; Delhi B.Com. 1957).

14. "The ocean and the land have their rich pastures and barren deserts." Discuss this statement with reference to the oceans as sources of food products.

15. Locate the major fishing grounds of the world and give their characteristics. Explain why commercial fishing is undeveloped in tropical waters. —(Cal. B.Com. 1964; Delhi B.Com. 1964).

16. Describe the industries of (*i*) Sheep rearing and (*ii*) Dairy farming as they are carried on in Australia and New Zealand.

17. What are the conditions of sources in the production of commercial wool? Illustrate your answer with reference to New Zealand, South Africa and Australia.

18. Describe the distribution of sheep in North America, Australia and New Zealand. Under what conditions does this animal thrive best?

19. About four-fifths of world's export of wool come from Australia, South America and South Africa. Describe the conditions under which sheep are reared in these southern continents and explain why the woollen industry has not developed in any of them in spite of an abundance of the raw material. —(Cal. B.Com. 1955).

20. Write an explanatory account of the different types of pastoral occupations to be met with in Australia and New Zealand. —(Cal. I.Com. 1956).

21. Examine the position of southern continents as producers of raw wool and manufacturers of woollen goods. —(Patna M.A. 1957).

22. What are the geographical and economic conditions for the development of dairy industry? Mention the countries which have specialised in this industry. —(Punjab B.Com. 1957).

23. Explain the factors which have stimulated the development of commercial dairy farming in certain parts of the world. Discuss international trade in dairy products. —(Delhi B.Com. 1969).

CHAPTER VI

INDUSTRIALISATION AND INDUSTRIES[1]

All over the world, men in their efforts to raise living standards are putting to use their increasing knowledge of science and technology to various economic activities. The economy that is emerging is industrialisation. Great Britain was the first country to transform its economy of agriculture and commerce to that of industry. The highly industrial countries are U.K., West Germany, France, Belgium, Sweden and Austria in Europe, U.S.A. and Canada in North America, Japan in Asia and South Africa in Africa. Each has brought about the industrial transformation in its own way in line with the physical environment and people's culture. Their success and prosperity have inspired other countries of the world to change their economy to industrialisation. In a sense, this is the age of total industrialisation. Although there is a tremendous gap in respect of industrial performances between those which had earlier starts and those which have just started industrialisation, ethos is pronounced in the latter.

The desire for the development of industries necessarily has led each country to search for suitable locations within its border.

In the beginning of industrialisation, the emphasis was on the nearness to raw materials and coal, and all industries were localised in places where these were available. Subsequently, the discovery of hydro-electricity permitted industries to locate outside coal fields but well within easy reach of raw materials. Thus, the presence of iron, coal and hydro-electricity along with availability of labour and transport facilities came to be the deciding factors for location of certain big manufacturing industries. The modern considerations are the cost of production, government policy, regional balance in economic development, availability of managerial talents and the scope for the use of technology.

[1] All figures in this Chapter have been taken from Statistics, Annual 1970, United Nations (1971) and the Statesman Year Book 1971-72.

Factors in Location of Industries

In spite of the fact that production in industrial units is hardly done in the open and that indoor temperature can be controlled, the influence of climate is best seen when, other factors being equal, the choice between two places is made on the ground of better temperature, less dust and reasonable humidity.

Nearness to sources of power is a powerful geographical factor inasmuch as modern industry consumes a large amount of power, derived from coal, petroleum or water. In the past, the concept of nearness was used in the context of physical presence of the power and raw material in the immediate neighbourhood. Today, this "nearness" means that power is available without much difficulty from the point of view of time and cost. If the source of power is coal, its availability near the location is an advantage because coal is bulky, and will increase the cost of production if imported from a distance on payment of heavy freight. "Nearness" may be 500 miles, if the freight charges and the total cost of bringing it to the industrial site are reasonable. Since freight rates in water transport are lower than those of railways, coal movements between countries normally take place through the former.

All countries do not possess oil fields, yet there is hardly any country which does not use oil as a source of power for some industries. Here, the problem of distance has been solved by the introduction of 'tankers' for the movement of oils and of cost by the opening of refineries in many countries.

While coal and oil are international from the point of view of movements, hydro-electricity is strictly national in use for industry. It is possible no doubt to transmit hydel power to a distance of 300 to 400 miles, but not beyond. When an industry depends on hydel power, the physical distance from the hydro-electric centre is always within this distance.

No modern industry can grow unless there is a continuous supply of raw materials in quantity necessary at a particular point of time. This means that there should be access to supply-areas which may be within the country or outside. Because of various tariff restrictions imposed by individual countries for strategic or commercial reasons, or because of high cost of tran-

sportation, the choice of supply-areas is limited. The sources of industrial raw materials are agriculture, mining, livestock, forestry and fishery. These primary industries are scattered throughout the world, and so also the different products of a particular primary industry. Consequently, the sources of a particular raw material for an industry may be world-wide. While geographical accessibility is assured by the development of transportation, the economic and political obstacles are not easy to overcome.

The object of locating industries near the sources of such raw materials is to set off the loss on operations from the saving in the transport cost.

This may result in a location, distant from market. But, if the marketing cost is higher, the pull may be in favour of nearness to market. Where both the raw materials and markets are geographically separated, the pull in favour of one of them will be decided by the cost of transport.[2]

Can a location stay good always ? Many locations of older industries are considered poor although they were excellent at the time when industries were started. The scope and range of raw materials are too wide today as an industry may require supplies from many directions. Also, an industry cannot also always be near the market because the market itself may be nation-wide or even international in character. So the main consideration is a location which will keep the sum total of freight cost at minimum.

Secondly, in older specialised locations there has been a large concentration of similar and other industries from the advantage in respect of labour, power, transport and finance. This concentration has however produced strains on land, transport and other services. Also, the concentration has led to disparities in the level of economic development between different regions of a country. In most countries, therefore, the governments are anxious to see a balanced development of industries, permitting every region to get benefits in respect of employment opportunities and of technology. New industries are coming up in new sites.

[2] See Sargent Florence, The Logic of Industrial Organisation, 1933, pages 44-46.

Thirdly, the second World War had demonstrated the need for strategic locations in the case of certain industries. Since then, such strategic sites have been selected for the development of many industries even in normal times. The site may not enjoy normal economic advantages, but higher considerations about defence and safety will prevail in its favour.

Man-Power in the Growth and Development of Industries

Locational factors alone do not ensure the growth of an industry unless the man-power is sufficiently competent to get benefit out of them. The locational factors are passive, and the active forces come from men who organise the resources, technology and efforts in an industry. This is true of all countries—developed and underdeveloped, of all industries—capital intensive and labour intensive, and of all markets—complicated and simple market structures. The differences in innovations and productivity and therefore in growth of the different countries of the world are due to the quality of their man-power.

The man-power for an industry consists of management and labour. Both are economic resources, and both can be scarce in spite of the large number of men in a country. Today, most industries are large in size and complex in activities; the markets are large and market structures and mechanisms are complicated; technological developments are frequent; investment of capital is enormous; and society's expectations from industry are articulate.

All these characteristics suggest that human agents in modern industrial set-up must have the abilities and motivation for giving a kind of performance which will help an industry to achieve the goal. Abilities come from skills and knowledge while motivation is the outcome of the presence of certain factors like type of management within an industry. Without abilities in men, no industry can succeed. Consequently, all important industrial countries have taken serious steps to develop man-power through technical education, professional organisations, and other measures. It has become quite common for underdeveloped countries to import technical know-how for use in industries. There is, in addition, technical collaboration between countries for the development of industry.

Finally, the process of industrialisation is accelerated only when technological improvements and practices are introduced. Technological gaps account for the slow rate of growth of industries. The task of closing the gap depends far more on the nature and scale of a country's industrial organisation and the efficiency with which it works than upon any other single factor. The application of science to industry depends upon the close relationship between research effort and the production and marketing process.

Conclusion

Industrialisation does not depend merely on the physical possession of raw materials and power within the boundary of a country; nor can a good location by itself be of any help in extending markets. These are powerful contributing factors, but the essential factor is the man-power which alone will determine the extent of growth. Since man-power growth is not static, an industry can gather strength in course of time, however weak it may be currently.

TYPICAL MANUFACTURING INDUSTRIES IN THE WORLD

The Iron and Steel Industry

The basic importance of iron and steel in the economy and welfare of any country is most considerable. In fact, modern civilization rests on iron and steel as it is difficult to conceive of shelter, protection, conveniences, and luxury without iron and steel. Although its use was known for thousands of years, till 1350 A.D. iron was produced by the reduction of iron from iron ore in a single step by using charcoal as fuel to remove foreign matters.[3] The product was known as *sponge iron* as it looked very much like a large black sponge. At present, the term is used to mean any kind of iron or steel made directly from iron ore, unless it is made in blast furnace when it is known as pig

[3] The earliest production of iron for use was perhaps made in an area between the Black Sea and the Caspian Sea sometime in 1500 B.C. The art of iron smelting became known by 1300 B.C. in the whole of Middle East.

iron. *Cast iron* made out of pig iron by running into moulds of the shape of the articles required. Since there are still impurities like sulphur and phosphorus, cast iron is brittle and cannot be welded. One great advantage of cast iron is that it can stand great heat. When impurities are removed from pig iron, the product is *wrought iron,* and this can be welded. *Steel* is pure iron to which a little carbon is added to harden it.

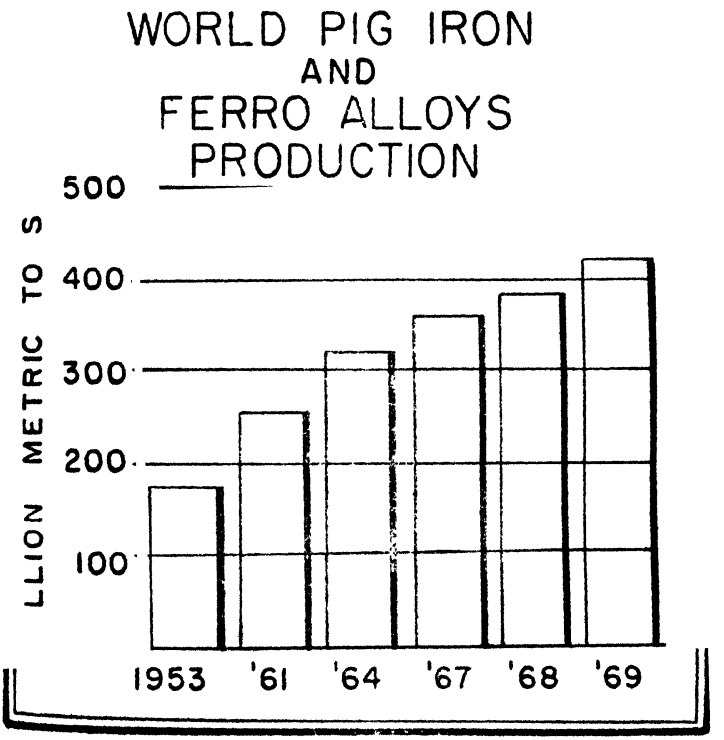


FIG. No. 39. World Pig Iron and Ferro Alloys Production

Pig iron—a product of blast furnace, is the basis of iron and steel industry. It is named so because sand pig beds were used to cast the molten iron which ran through a long groove and thence into many smaller grooves at right angles, to give the appearance of a litter of pigs nursing at the side of mother pig. The essential raw materials for the production of pig iron

are iron ore, fuel, flux and air blast. The iron ores commonly used in the making of pig iron are the oxides of iron. The percentage of iron that is required in an iron-bearing mineral for smelting may be between 25 and 70 p.c. Coke is the principal fuel for pig iron, though use of charcoal is still common in certain countries. The carbon in the coke unites with the oxygen of the ore under heat, and allows molten iron to fall to the bottom of blast furnace being free from oxygen. Limestone or dolomite facilitated this smelting of iron ore, and was thus called a "flux".

Another factor is the weight of the atmospheric air that can be blown in for the combustion of the coke in making pig iron. The air must contain a certain amount of moisture in the air blast all the time.

Pig iron is subject to refining process in order to convert it into wrought iron or steel, after the removal of impurities like carbon and silicon. When carbon is reduced to a certain minimum it is steel, and when fully removed it is wrought iron. There are many methods of converting pig iron into steel such as the cementation process, the crucible process, the Bessemer process, the open-hearth method, and the electric furnace.

PIG-IRON AND FERRO-ALLOYS

(In 1,000 metric tons)

	1953	1963	1969
U.S.A. ...	70,035	66,998	88,570
U.S.S.R. ...	27,415	58,691	81,634
West Germany ...	14,094	23,014	34,015
Japan ...	4,653	20,434	59,444
France ...	8,767	14,507	18,623
U.K. ...	11,352	13,912	16,653
China (Mainland) ...	2,234	17,000	19,000
India ...	1,804	6,742	7,501
World Total ...	168,200	281,200	417,200

The world production of pig iron and ferro-alloys was 417 million metric tons in 1969 as against 168 million in 1953. U.S.A. with about 89 million tons is still the world's largest producer ; U.S.S.R. is a very close second with 82 million tons.

Between 1953 and 1969, many countries have made great progress in the production from a small beginning. These countries are India, Italy, Bulgaria, Mexico, Yugoslavia and Finland. Nowhere else in the world the progress has been so stupendous in recent years as in Japan which is now the third leading producer of pig-iron and ferro-alloys.

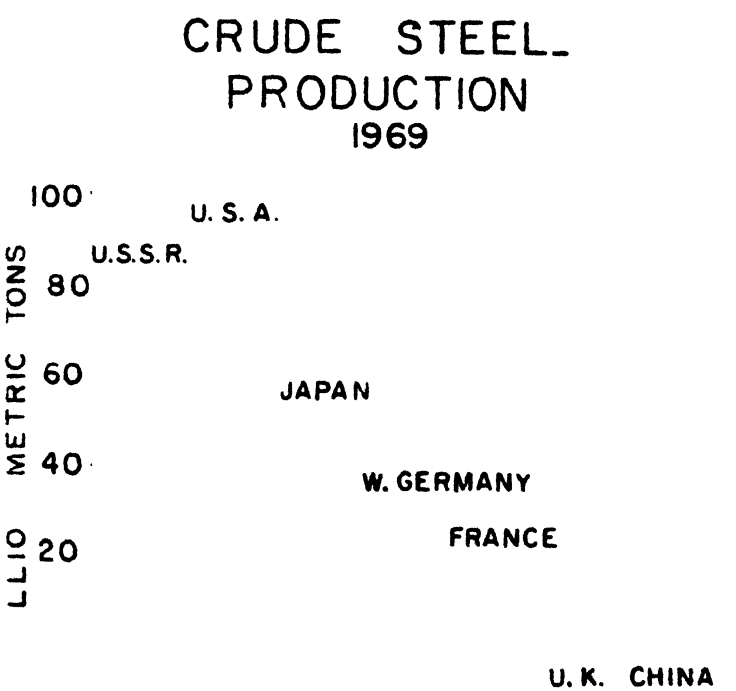


FIG. No. 40 Crude Steel Production—1969

Causes of Location and Concentration

The geographical reasons for the localisation of iron and steel industry have undergone considerable changes in respect of emphasis. In the beginning, when the industry was started

(*a*) local deposits of iron ore,

(*b*) presence of charcoal from forests,

(*c*) nearness to stream for power in blast furnaces, and

(*d*) local demand

were the deciding factors. Later on, the industry also developed near coalfields because of the use of coal in place of charcoal. At present the more important factors, apart from deposits of some iron ore and coal, are (*i*) the availability of technical skills, (*ii*) the easy access to sources of iron ore and coal through transportation facilities, (*iii*) cost of transportation, (*iv*) the scope and ease of controlling ore, coal and limestone deposits, and transport organisations for integrated production, (*v*) the growth of industries requiring useful iron and steel products as in automobiles, railways, machine tools, farm equipment, etc., and (*vi*) general technological progress through research to permit use of new methods and techniques as a routine.

It is clear that modern iron and steel industry is based on knowledge of technology and organisation, and only a few countries have therefore the capacity and capability of developing it. The availability of iron ore and energy within a region no doubt still remains the main consideration, but all iron ore producing countries are not necessarily the producers of steel.

In 1969, out of the world's total production of 572 million metric tons of crude steel, six countries—U.S.A., U.S.S.R., Japan, West Germany, U.K. and France produced 408 million metric tons, that is, about 78 p.c. of the world's total. These six countries, on the other hand, raised only about 60 p.c. of the world's iron ore in the same year. The distribution pattern of world crude steel production has not undergone much change during the last 20 years except in terms of quantities produced.

CRUDE STEEL PRODUCTION

(In 1,000 metric tons)

	1953	1967	1969
U.S.A. ...	101,250	115,406	128,151
U.S.S.R. ...	38,128	102,224	110,328
Japan ...	7,662	62,154	82,166
Germany (W) ...	18,103	36,744	45,316
U.K. ...	17,891	24,278	26,422
Italy ...	3,500	15,890	16,428
France ...	9,997	19,655	22,511
India ...	1,531	6,380	6,464
World ...	234,700	493,000	572,300

The most interesting fact in the production of steel is the competition between U.S.A. and U.S.S.R. From 12 million tons of steel by U.S.S.R. as against U.S.A. production of 72 million tons in 1945, U.S.S.R. raised it to 110 million tons in 1969 compared to 131 million tons by U.S.A. In 1971 U.S.S.R. had 121 million tons, but in the same year, the U.S.A. production came down to 112 million tons. U.S.S.R. has plans to raise the production to 131 million tons in 1973.

Iron and Steel Industry in U.S.A.

The iron and steel industry is most intimately associated with the economy of the U.S.A. as more than 40 p.c. of its industrial population are engaged in the manufacture and use of iron and steel.

Causes of Growth

A combination of circumstances was responsible for the beginning of Iron and Steel industry in the U.S.A. The presence of low grade deposits of iron ore along the Atlantic Seaboard, the abundant virgin forests as sources of charcoal, streams for power for air blasts and the difficulty of importing steel goods from Europe encouraged the colonists to work local consumption. Till 1865, the industry was characterised more by expanded output than by improvement in technology. Thereafter, technical advances and consolidations of steel companies resulted in economies of operation and enormous production. Currently, the iron and steel industry of the U.S.A. is foremost in the world in respect of production, improved metallurgical and mechanical techniques, best beneficiation of lower grade iron ore and advanced research for improving methods. The products are pig iron, raw steel, steel by open hearth, steel by electricity and steel by basic oxygen.

Sources of Iron Ore

The chief sources of domestic iron ore are (*a*) the Mosabi range near the Western side of the Lake Superior, (*b*) the Peninsular Michigan between Superior and Lake Michigan, and (*c*) the Appalachians, specially in the district of Alabama.

The domestic production of high grade iron ore is not adequate enough to meet the demand of the iron and steel industry, and imports are obtained from Venezuela, Canada, Peru, Chile, Sweden, Liberia, Brazil, Mexico, Algeria and Spain. Normally, the United States imports 25 per cent of her requirements.

Centres of Steel Production

There are four principal centres of iron and steel production in the U.S.A., (*a*) Pittsburg district, (*b*) Lake-side centres, (*c*) New England region, and (*d*) the Alabama district.

Pittsburg district has remained a major producer ever since it started production. The centres are Pittsburg, Alleghany, Akron, Warren and Sharon which specialise in production mostly of locomotives, engines and machinery. Local coal comes from the North Appalachian fields, and iron from the Lake Superior region.

Lake-side centres owe their importance to the locations near the Great Lakes which not only provide facilities in transport and easy access to markets but also help the movements of iron ore to the east from the Superior region and coal to the west from Pennsylvania. The centres are Cleveland, Buffalo, Detroit, Chicago, Milwaukee and Duluth with specialisations in agricultural implements, machine tools, automobiles, locomotives and machinery.

Birmingham in Northern Alabama is a great centre of iron and steel production, and has developed on account of the local rich coal mines, an extensive bed of iron ore, presence of limestone and dolomite, and cheap local labour. In fact, it has all the factors that make a centre great in leadership.[4] The reasons for her not being the leader, are her distance from the industrial north-east, absence of inland water transport nearby and the greater enterprising spirit of her rivals in the North.

New England region comprising eastern Pennsylvania, Maryland and New Jersey, has iron and steel production for a very long time. The earlier factors like local supplies of iron

[4] Andrew Carnegie the founder of the Steel Corporation in Pittsburg predicted that Birmingham would be the future iron and steel centre of America.

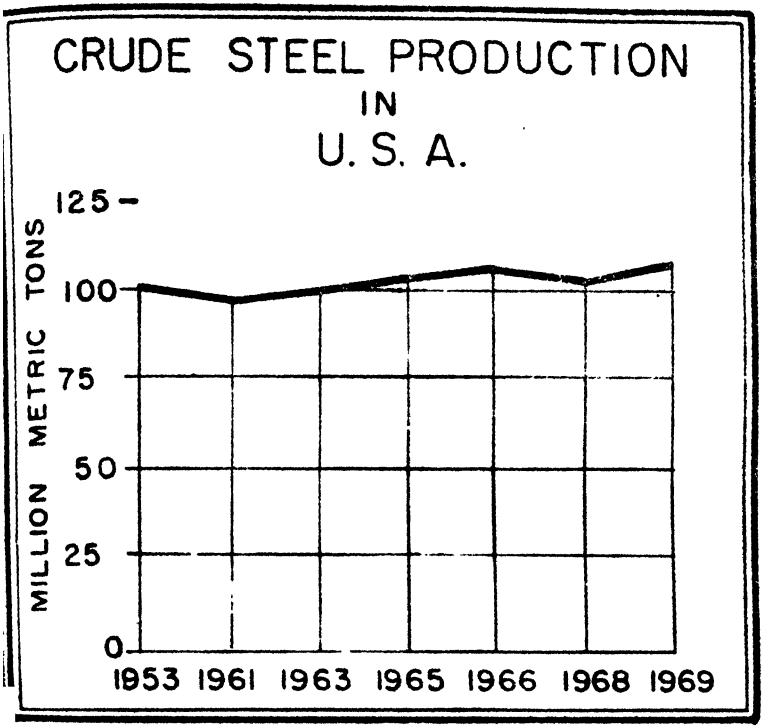


FIG. No. 41. Crude Steel Production in U.S.A.

ore, presence of forests for charcoal, streams for power and the local market for agricultural implements are no longer powerful enough compared to other areas. Partly because of geographical inertia and mainly because of specialised character of her steel produced from a union of domestic and foreign ores, the region has a number of centres like Sparrows Point, Worcester, Bethlehem and Philadelphia

Markets for Iron and Steel of the U.S.A.

Since the country is the largest consumer of steel in the world, the U.S. markets are mostly for the products from steel like automobiles, refrigerators, washing machines, industrial machines, rail road cars, etc.

The U.S.A. does not export pig iron although a small quantity of iron ore to the extent of 1 million tons is exported to

Japan. The markets for U.S. steel products, however, are world-wide, and the bigger consumers are the U.K., Japan, Latin America, Canada, Philippines, U.A.R., Italy and Thailand.

Of late, the U.S. steel interests have become seriously concerned about the rapid growth of Japan's steel production capacity for export and the steady gains that imports of steel are

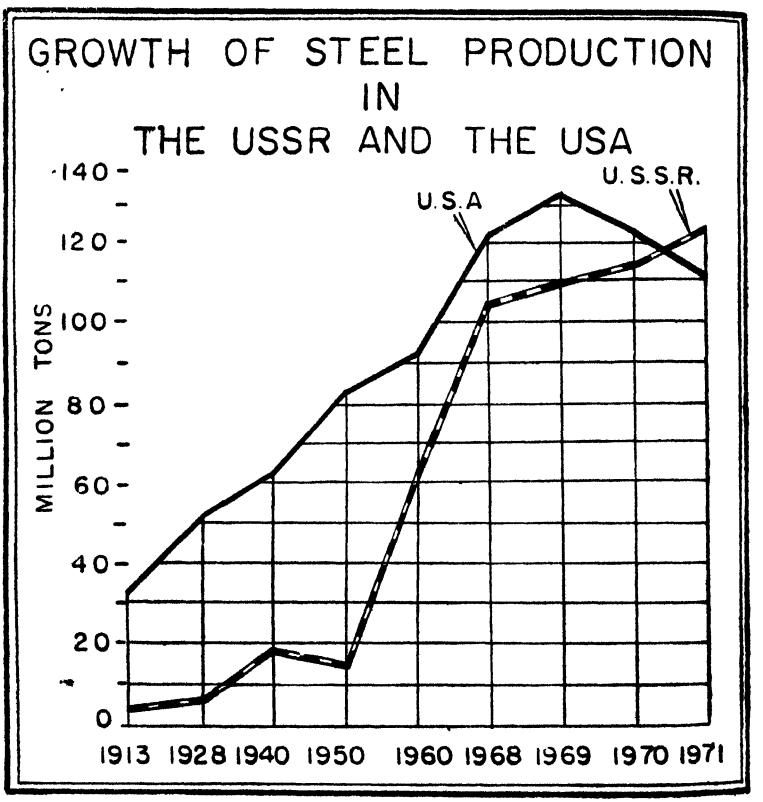


Fig. No. 42. Growth of Steel Production in the USSR and the USA

making in their market. The imports of iron and steel-mill products are of the value of $1020 million a year. In future, some measures for protectionist statutory action are likely to take place, against Japan. Amazingly, however, the U.S.A. supremacy in steel and pig-iron production has not only been

challenged but actually taken over by the U.S.S.R. from 1971, because of the decline in the production in U.S.A. from 1970 onward and of the increase in production in U.S.S.R. from the same period. The U.S.S.R. is yet to reach the peak production of U.S.A. in 1969.

Iron and Steel in U.S.S.R.

U.S.S.R. is the second leading producer of iron and steel in the world, being behind U.S.A. only by a narrow margin of production. Its rate of growth since 1948 has been much faster than that of any other country in the world. The trend in steel production has upward movement due to the priority given to it by the Government and State ownership of the industry.

IRON AND STEEL PRODUCTION

('000 tons)

	Pig iron	Ingot steel	Rolled steel
1950 ...	19	27	21
1960 ...	47	65	51
1964 ...	62	85	57
1966 ...	70	97	77
1967 ...	74	102	81
1969 ...	81.6	110	76

With 121 million tons steel production in 1971, U.S.S.R. now occupies the first position in the world in this branch of industry. U.S.S.R. was also ahead of U.S.A. in pig iron production in 1970.

Causes of Growth

The reasons for her spectacular growth are (*a*) the enormous deposits of coal and iron ore, (*b*) excellent transportation facilities for the movements of coal and iron, (*c*) larger reserves of coal and iron ore on account of late start, (*d*) geographical dispersion of plants, on the basis of local supplies of coal and iron ore, (*e*) radical technical reconstruction of the ferrous

metallurgy, which consisted in the transition to new types of metallurgical plants, (*f*) steady advancement of metallurgy to new regions possessing untouched reserves of high grade raw materials and fuels,[5] (*g*) government's determination to increase production and (*h*) the determination of people to 'surpass America'.

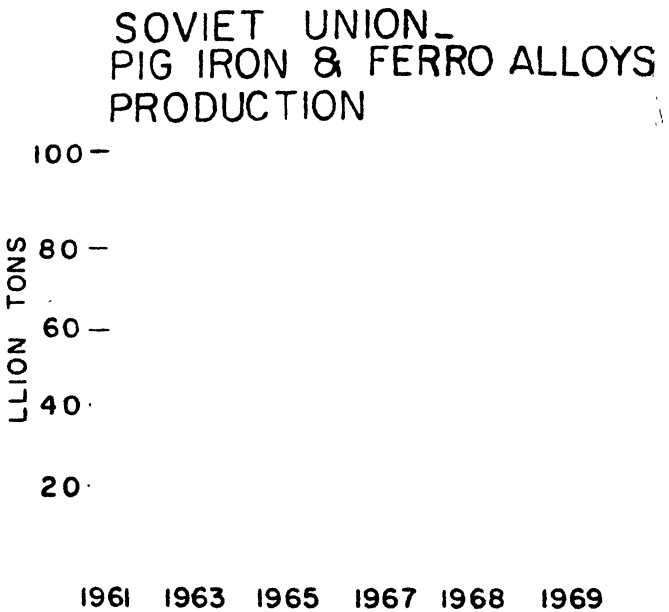


FIG. NO. 43. Soviet Union—Pig Iron and Ferro Alloys Production

A number of fundamentally new production processes have been developed for the steel industry. Soviet Union is the first in the world to use oxygen and natural gas to raise the efficiency of metal-making units. Soviet Union has also developed a very effective method of purifying steel with synthetic slags. There is also maximum mechanisation of labour consuming processes in pig iron production.

[5] See, N. Baransky : Economic Geography of U.S.S.R. (Foreign Language Publishing House, Moscow, 1956), p. 39.

Areas of Production

The principal iron and steel producing areas are:

i. The Ukraine and the Rostov Regions;

ii. The central region with Moscow and Leningrad and Lipetsk and Tula; and

iii. The Ural-Kuznetsk Combine.

The Ukraine is the most important area for iron and steel in U.S.S.R. The Donbas basin is the coal base, and iron ore comes from Krivoi Rog and Kerch. About 48 p.c. of pig iron and 40 p.c. of steel in the Union come from this region alone.

The Central Region is noted for the production of high grade steels. As many of its centres like Moscow, Gorki and Murmansk suffer from lack of iron ore and coal deposits, the production is confined to a few specialised products of high quality. The Ural-Kuznetsk region is an example of co-operation between a coal producing region and an iron ore producing region—though separated by two thousand kilometres from one another, for developing two groups of plants. Ural group uses coal of Kuznetsk and Kuznetsk group takes Ural iron. Magnigorsk in the Urals and Kuznetsk in the Kuznetsk coal basin are the two centres for high grade metals.

The other centres are Osk-Khalitovo in the Urals, Karaganda in Kazakhstan, Taishet near Lake Baikal and Komsomolsk on the Amur river.

Markets for U.S.S.R. Steel

Domestic consumption of steel being a little less than the production, the country has markets for steel and its products in East Europe, Africa and Asia. The products do not compete directly with those of U.S.A., West Germany or Japan as the trade is mostly on the basis of bilateral agreements.

Problems

Since many of her plants have been developed on political considerations, cost of operation is yet to be made economical to gain competitive strength. Secondly, deposits of high grade coking coal and iron ore are not large enough to ensure world leadership. Despite these problems, the U.S.S.R. has programme

for raising the production of steel to 146 million tons by 1975 which will exceed the record production of the U.S.A. in 1969

Iron and Steel in West Germany

In spite of Germany's defeat in two World Wars, and the fact that the country is now divided into two political units, the position in respect of iron and steel production has always remained strong with a few interruptions immediately after the two Wars.

West Germany is now the fourth leading producer of pig iron and crude steel, and also the third largest consumer of steel in the world.

IRON AND STEEL PRODUCTION IN WEST GERMANY

(In '000 metric tons)

	1960	1963	1965	1969
Pig Iron ...	25,739	22,909	26,990	33,764
Crude Steel ...	34,100	31,597	36,821	45,316
Rolled Steel ...	22,531	20,990	24,836	32,247

Causes of Growth

(1) *Historical Factors*: (*a*) Acquisition of Lorraine in 1871 gave her extensive deposits of iron ore; (*b*) Bessemer process made it possible to use iron ore of high phosphorus content in other areas; (*c*) local coal from the Ruhr field, the biggest coal-field in Western Europe assured a continuous supply of power, and (*d*) the navigability of the Rhine for import of raw materials and export of finished goods, accounted for the steady expansion of steel plants.

(2) *Modern Causes*: The modern development of iron and steel in Germany is primarily due to non-geographical factors which are as follows: (*a*) high knowledge of technological science and its application to metallurgical industry; (*b*) industrial population, requiring little adjustment in new metallurgical industries; (*c*) workers' willingness and cooperation to accept technical improvements and changes; (*d*) Free world's recogni-

tion of Germany's position in European economy and its assistance for the restoration of political *sovereignty* after her defeat in World War II for reconstruction of her industry; and (*e*) the European Coal and Steel Community as an agreement to give her opportunity for expansion of the steel industry with the assurance of supplies and market.

The Areas of Production

The Ruhr Valley is the main steel region with centres like Essen, Dusseldorf, Dortmund, Solingen and Hagen in an area of about 35 miles wide and 60 miles long. The Valley is the most populous and highly industrialised in all Europe, and has a magnificent system of roads, railroads, canals and riverways. The Rhine allows cheap and quick access to the Sea. The main strength of the metallurgical industry in the Valley is the presence of coal in enormous quantities.

Two other important centres are Hamburg for ship-building and machinery and Frankfurt for ferro-alloys.

The crucial problem of her industry is the shortage of domestic iron ore of high-grade quality, and this makes it necessary for her to maintain good relations with France. The other sources of import are Spain, Sweden and Algeria.

Iron and Steel in Japan

Japan has not enough resources either in coal or iron ore compared to other leading industrial countries of the world. She raises about 2 p.c. of the world's total coal with about 54 million tons a year, and less than 0.5 p.c. in iron ore with about 1.2 million tons a year. Yet, Japan is the fourth leading iron and steel producing country in the world. In pig-iron, it is ahead of U.S.S.R.

IRON AND STEEL PRODUCTION

(In '000 tons)

	1948	1960	1963	1967	1969
Pig Iron ...	836	12,341	20,434	41,040	59,444
Crude Steel ...	1,715	22,138	13,501	62,154	82,166

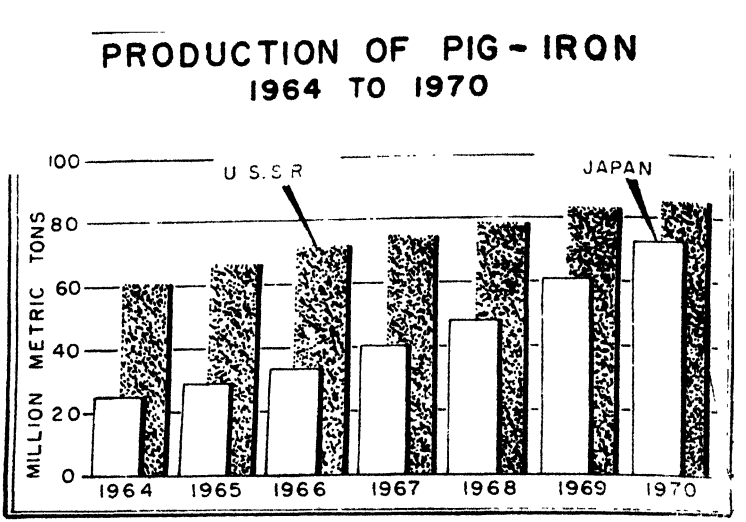


FIG. No. 44. Japan is ahead of U.S.S.R. in Pig-Iron Production

Causes of Growth

(1) *Historical Factors*: (*a*) Small local supplies of iron ore; (*b*) comparatively large supplies of domestic coal and development of water power; (*c*) ease of importing iron ore from Korea, China, Malaysia and South Pacific areas; (*d*) large demand for metallurgical goods for domestic industries; (*e*) government's support to the development of the industry in a few decades through tariff on imports, and financing plants; (*f*) ethos of the people to create a modern nation with modern industries like steel; and (*g*) cheap and efficient labour.

(2) *Modern Causes*: The historical factors are, however, not very effective today. Her tremendous development of steel production which began from 1954 when the allied powers withdrew economic and political restrictions, was supported by a number of new factors. These are: (*a*) enlarging markets for Japanese goods abroad, and the domestic demand for metallurgical products to produce them; (*b*) wide trade connections permitting flow of iron ore from the Australia, Malaysia, U.S.A., Canada and India, 13 times as much as domestic production; (*c*) her attitude to grow as a peaceful international community; (*d*) skilled labour; (*e*) the democratisation of the control and operation of industry and legalisation of trade

unions; (*f*) dependence on industrial economy by a nation of enterprise and skills; and (*g*) industrial research and their application to steel industry.

The Area of Production

The industry is confined to a few centres which possess shipping facilities for the import of iron ore. The most important centre is Yawata in Northern Kyushu which produces about 60 p.c. of the country's output in steel. The other centres are Tokyo, Nagasaki, Kobe, Yokohama and Osaka.

The most astonishing development has taken place in machine manufacturers which account for 25% of the total exports.

Japan has become a large exporter of steel to Asia and North America since 1960. The volume of her export of iron and steel in 1969 was more than 15 million metric tons. The rate of increase of iron and steel exports to U.S.A. has been increasing by more than 10 to 15 p.c. annually. The entry of this enormous volume of Japanese steel has created an uneasy feeling in the U.S.A. Unless Japan plans a voluntary control system to govern exports of steel products to the United States market, imposition of import surcharge and an official quota system may come about as a possible U.S. action. Attempts are being made to see that some kinds of voluntary restraints on the part of Japanese steel industry so as not to increase exports to American markets by more than 10 p.c. annually are exercised.

Iron and Steel Production in Britain

Although Britain pioneered the application of coal to the smelting of iron ore from the seventeenth century onwards and British investors were responsible for the series of discoveries which led to the great expansion of steel making in the second half of the nineteenth century, she never held the premier position in the production of steel after 1900. Her pre-occupation with commerce and the development of the textiles for her vast markets in the Empire did not allow the iron and steel industry to expand for its leadership in the world. Nevertheless, Britain has always been one of the leading pro-

ducers of iron and steel, and in 1969 she occupied fifth position in respect of crude steel with 26 million tons of production.

IRON AND STEEL PRODUCTION

('000 metric tons)

	1960	1967	1969	1970
Pig Iron	16,016	15,396	16,390	17.393
Crude Steel	24,695	24,278	26,422	27.883

Sources of Iron Ore

Her deposits of iron ore which are quite considerable are, however, of low grade. The most important iron-ore field lies in South-East England. The iron fields of the U.K. cannot meet the entire requirements of the metal industry. Iron-ore is imported on the grounds of quality and resultant economy. Many of the mines which yielded very rich ores are almost exhausted, and the easily accessible types of ores require a considerable outlay to provide fuel for smelting. Therefore, Britain finds it economical to import rich ores from Sweden, Spain, France, Brazil, North Africa, and Newfoundland. This imported ore is normally haematite. In 1970, she imported 19 million tons of iron ore. Within the country the principal iron ore centres are (*a*) in the Cleveland Hills; (*b*) at Scunthorpe and Fordingham in Lincolnshire; (*c*) at Corby and Kettering in Northamptonshire; (*d*) near Banbury in North Oxfordshire. The supplies of South Wales iron ore have been nearly exhausted and the iron and steel industry of this area now depends on Spain and France for iron ore.

Range of Production

Steel production is closely related to mechanical and electrical engineering, and there has been much modernisation and development of steel industry on a large scale after 1948. Iron and Steel Board, set up in 1953, exercises a general supervision over the iron and steel industry. About 300,000 persons are employed in iron and steel manufactures, excluding iron foundries which employ about 200,000 persons. Machine tools, textile machinery, locomotives, agricultural machinery and office

equipment are the chief products of mechanical engineering in U.K. The total value of these five products is enough to pay for all the imported metal ore. Equally powerful is the existence of electrical engineering. The electric telegraph, submarine telegraphy, heavy electrical engineering equipment for generating plant and industrial purposes, electronics (radio, television and radar) and the making of electrical appliances like irons, heaters and washing machines—all have made electrical engineering a very powerful industry in U.K.

Areas of Production

There are five principal areas of production, each with its own geographical reasons for growth and its specialised range of production.

(*i*) *The Black Country.* This has become the chief iron and steel-producing area of Britain. Local supplies of iron, wood, charcoal and limestone gave birth to the industry in this area. The distance of the area from the sea makes cost of transport heavy, and, therefore, goods which are valuable in proportion to their bulk are manufactured here. The important centres are Birmingham, Coventry, Dudley and Redditch. *Birmingham* specialises generally in the production of motors, cycles, railway equipment. machine tools, electrical apparatus and brassware; *Coventry* in cars and cycles; *Redditch* in needles; and *Dudley* in Chains.

(*ii*) *Sheffield.* The manufacture of metal goods in the region owes its origin to the former existence of local iron-ore, wood and water-power. The bulk of the iron-ore is now drawn from Lincolnshire and Sweden. Both heavy (*e.g.*, manganese steel, chromium steel and tungsten steel) and light (*e.g.*, cutlery) metal goods are manufactured in Sheffield. Other centres are Rotherham and Chesterfield. Sheffield district produce 12 p.c. of the total crude steel.

(*iii*) *The North-east Coast: The Tyne, Wear and Tees region.* Tee-side is the chief iron-smelting centre. Other towns in the locality are Hartlepool, Middlesborough and Darlington. The advantages of the region for steel industry are: (*a*) the nearness of the iron-ore, (*b*) the excellent coking coal of South Durham, (*c*) the supplies of limestone in the

Pennies, and (*d*) the facilities for importing high-grade ore from Sweden and Spain. Hartlepool is noted for ship-building. Darlington is an important centre for railway engines and Middlesborough, is an engineering centre. In Tyne-side the chief centre is Newcastle where ships of modern design are built. Wear-side, with Sunderland as the chief centre, builds cargo-boats. About 16 p.c. of iron and steel comes from this region.

(*iv*) *The Furness District.* This North-Western coastal region produces steel and pig iron. Barrow is the ship-building centre.

(*v*) *South Wales* manufactures tin-plate and galvanised iron. Iron-ore is imported from Spain and Algeria, and tin is drawn from Malaysia, Bolivia and Nigeria. Swansea and Llanelly are the two chief towns of the region. South Wales produces about 20 p.c. of the total crude steel output.

The emphasis is increasingly improving efficiency rather than raising total capacity. Britain has some of the most modern plants in Europe. Industry-wide scientific and technological research is carried out by the British Iron and Steel Research Association, and the British Steel Corporation. The iron and steel industry has been subject to some form of public supervision. The Iron and Steel Act of 1967 brought into public ownership 13 major steel companies together producing more than 90 p.c. of Britain's crude steel and employing about 70 p.c. of the man-power in the industry.

Markets of British Steel Products

In 1970, U.K. exported 3.7 million tons of finished steel products. In view of the wide range of her steel goods, and her traditional markets in the Commonwealth countries and dependencies, the markets for her steel goods are world-wide. While her exports to Commonwealth countries, and U.S.A. have maintained a steady flow, it is not so in European markets. West Germany has gone ahead of U.K. in steel production, and the impact of the European Common Market is keenly felt in Britain's export trade of steel and steel goods.[6] She has formed

[6] Now that U.K. has joined the Common Market along with three others in January 1972, the position of U.K. steel will improve as it will have an advantage over Japan and the U.S.A. in the Common Market.

a European Free Trade area with Norway, Sweden, Switzerland, Austria and Portugal to counteract the impact.

The post-war phenomenon of her export trade is the dominant position of steel products. She must, in order to retain and expand it, increase her crude steel production. The increase in crude steel will make it possible for the steel industry to meet and defeat competition in the market from rival materials as well as to export to a number of developing countries whose requirements are likely to rise very rapidly in the years ahead. Much will, however, depend on the steel industry's success or failure in reducing costs. The two principal raw materials of the steel industry are iron ore (mostly imported) and coal which together make up over two-thirds of the cost of steel.

Iron and Steel Production in India

In recent years India has made good progress in the iron and steel industry. Although in terms of production, she is far behind other important producers, being eighth in pig iron and thirteenth in crude steel in 1969, the rate of growth is quite high.

The evidence of her early tradition in iron is available in the iron-pillar of Delhi, dating back to 1600 years and in the iron beams of Konarak temple in Orissa. The iron industry of India used to supply local wants and to export its finished products to foreign countries. Indian steel furnished the materials out of which Damascus blades with a world-wide reputation were made. Even England imported Indian steel to manufacture cutlery. India's steel and wrought iron reached a perfection at least 2,000 years ago[1]. Because of continued political disturbances within the country for centuries, the industry almost died from the point of view of the country's economy, and continued to live in scattered areas on a very small scale to meet the demand of local market for utensils and weapons.

[1] See Industrial Commission Report, 1916. Pandit Madan M. Malavia's Note of Dissent.

History of Revival of the Steel Industry

The first attempt to manufacture steel on modern lines was made in 1830, at Porto Novo in South Arcot, Madras. The want of adequate equipment and fuel led to its closure in 1874. The second attempt was made in 1874 on the Jharia coalfield. The really effective results came from the industry that was started at Sakchi (now known as Tatanagar) in 1908. However till 1948, there were only four centres: Jamshedpur, Burnpur, Kulti and Bhadravati, with total production of 1 million ton pig iron and 1 million ton crude steel. Today, because of India's realisation of the importance of steel as a basic necessity, a number of centres for steel production both in the public and private sectors have been established, and the production is on the increase.

PRODUCTION OF IRON AND STEEL IN INDIA

(In '000 tons)

	1948	1960	1967	1970
Pig iron ...	1,487	4,260	7,027	7,390
Crude steel ..	1,277	3,287	6,380	6,439

Causes of Growth

The factors that operated in favour of Iron and Steel production before independence were as follows:

i. Genius of Jamshedji Tata to start operations in 1908 in spite of the difficulties of skilled and technical labour;

ii. large deposits of iron ore within easy reach of coalfields in Bihar, Orissa and West Bengal;

iii. iron reserves in Mysore;

iv. presence of limestone and dolomite near the iron ore areas, and

v. railway lines in coal and iron ore areas.

The more powerful factors, however, were provided after the Independence. These factors are:

i. Increasing demand for steel and steel products in the country to develop other industries.

ii. The government's role in providing impetus in the interest of industrialisation.

iii. The eagerness of the country to save foreign exchange by its development.

iv. Vast reserves of iron ore in Madhya Pradesh, Orissa, Tamil Nadu, Mysore, Maharashtra and Goa, and

v. Discovery of new coalfields.

Sources of Raw Materials

The raw materials are iron ore, coal, dolomite and limestone. Iron ore is available in four different kinds; magnetite, laterite, clay iron stone and haematite, the last being the most valuable in respect of quantity and quality and found in Bihar and Orissa. Her resources in high grade iron ore are vast. Orissa supplies about 40 p.c. of India's requirements. The other areas are Madhya Pradesh, Mysore, Maharashtra and Goa. Salem and Tiruchirapalli also possess large deposits of iron ore. Dolomite and limestone along with other metallic ores required in smelting are available within a short distance of iron-fields. Although coal is abundant, the position of coking coal is not satisfactory, and it appears that India will have to depend more and more on coal washeries and benefication of limestone.

Areas of Steel Production

1. Tatangar in Bihar.
2. Burnpur in West Bengal.
3. Bhadravati in Mysore.
4. Durgapur in West Bengal.
5. Rourkela in Orissa.
6. Bhilai in Madhya Pradesh.
7. Bokharo in Bihar.

The first three are in the private sector and the others in the public sector. With the exception of Bhadravati, where it is charcoal, the coking coal is used in all centres.

Range of Products

Indian iron and steel industry has a varied pattern of production like heavy rails and fish plates, heavy structurals, light

structurals, sleepers, tin plates, sheets etc. As yet the domestic range and volume of production cannot satisfy the requirements within the country.

Problems

For the development of iron and steel industry in India, the problems are to be viewed in terms of existing units and the proposed ones. For the existing units, the problems relate to transport, grading system for raw materials and the excise duties.

The transport facilities are still inadequate to meet the demand of the iron and steel industry for movements of raw materials and finished products. In view of the increased activities in most industries located near Jamsedpur and Durgapur, the iron and steel industry in these two areas are experiencing considerable difficulties in obtaining supplies or sending finished products by railways. Both Rourkela and Bhillai are located in areas not yet industrialised. The development in transport has not kept pace with the growth of industries that are taking place. Second problem is the variation in the quality of raw materials for lack of proper grading. The sources of raw materials are not the same for all the centres. The arrangements of grading in respect of coke and iron ore differ considerably from centre to centre, resulting in the variation of quality of finished products. Third problem is that high excise duty which has made Indian steel very expensive for consumers. Although there are many factors which account for high cost of production, the difficulties in handling them for productivity suggest that the present excise duty should be reduced.

For the proposed steel units which will be all in the public sector, the selection of sites will have to be made from the point of view of the availability of iron ore from the mines, the presence of technical personnel, the preparation of the detailed project reports, the investment of funds for equipment and operations, the disposal of finished products and the structure of organisation and efficient production to keep the cost competitive.

Of the total production of 6.4 million tonnes of Steel in India, the public sector contributed 4.5 million tonnes in 1971.

This means that the utilization capacity was 67 p.c. There is a plan to raise the utilization capacity to 82 p.c. in 1972-73, bringing the production up to 5.5 million tonnes.

Markets Abroad

Indian pig iron and steel manufactures are being exported in increasing quantities. The buyers of pig iron are U.K., U.S.A. and Japan. India's location of easy accessibility to the markets of the Indian and Pacific Oceans, the proved metallurgical skill of her labour and the commercial ability displayed in the export of pig iron indicate that India's iron and steel industry has a bright future.

Iron and Steel in other Countries

Canada : Growth is based on the belief that Canada should produce most but not all requirements so as to provide a little cushion for the steel industry by importing when conditions are good and not doing so when the conditions are bad. The important regions are Ontario and Quebec with S. S. Marie, Welland, Hamilton, Montreal, Quebec, Sorel and Sherbrooke as centres. The other centres are Sydney, Vancouver and Selkirk. The production of crude steel in 1969 was 9 million tons.

France : With an annual production of about 55 million tons of iron ore and 48 million tons of coal a year, France has a well-developed steel industry in the Lorraine Basin. Her production of pig iron was 18 million tons and of steel 22 million tons in 1969.

Brazil : It is currently the largest steel producer in Latin America. The inadequate supplies of coal stand in the way of its progress. The country has a plan to increase the steel production considerably by 1975.

Leading Engineering Industries

Engineering industries comprise a wide range of manufactures, like machines and machine tools, industrial machinery, heavy electrical equipment, aircrafts, automobiles and ships. With the exception of aircrafts, automobiles and ships, all industrial countries with development of iron and steel produc-

tion are engaged in the manufacture of mechanical engineering products on a mass scale both for domestic and foreign markets. To a large extent, the industrialisation is measured in terms of the range and quantity of such products.

Apart from the presence of raw materials and good transportation facilities, the essential factors for engineering industries are highly skilled labour, technicians and engineers and industrial research. Consequently, the order of importance of countries in engineering goods is also an index of the spread of technical and the general attitude of people towards technological advances.

Machine tools and machine-making machines. In any country it plays a leading part in equipping technically its economy. The leading producers are U.S.A., West Germany, U.K., France, Switzerland, Sweden, Italy, Austria and Japan. The **U.S.A.** has the leadership in production although her export position is rather weak on account of high rates of wages paid to the workers and the competitive nature of the products in the world market. The competitors are U.S.S.R., West Germany and U.K. The U.S.A. centres are Chicago, Milwaukee, Detroit, Pittsburg, Buffalo and New York.

U.K. is the birth place of the machine tool industry, but today the industry is known for its high degree of specialisation and is far behind U.S.A., U.S.S.R., and West Germany. The industry is localised in the Midlands, Yorkshire, Lancashire, London and Glasgow. The Government assists the industry in various ways, including pre-production purchase schemes and the encouragement of stock building. The high degree of specialisation, makes it possible for small firms to prosper

U.S.S.R. : The machine building industry on modern lines in U.S.S.R. is of recent growth, and yet the country is second today in its volume and composition. Moscow and Leningrad are the main centres of machine tools having the advantages of technical research institutes, skilled workers technical personnel and diverse subsidiary enterprises. The other centres are Kharkov, Kiev and Dnepropetrovsk in Ukraine and Sverdlovsk and Nizhni in Urals. The main function of each centre is to produce highly efficient types of machines and equipment.

West Germany : Highly skilled labour and well-equipped plants characterise the West German machine tool industry. The cost of production is much lower than in U.S.A. The production is concentrated in Cologne, Essen, Dusseldorf, Frankfurt, Stuttgart and Berlin.

The other countries noted for machine-building industries are Belgium, France, Switzerland, Italy, Sweden, Czechoslovakia and Japan.

Aircraft Manufactures

Aircrafts have importance in defence works, commercial aviation and business aviation. Till 1918, it was the military necessity which provided the greatest spur for the development of aircraft industry. Germany was the pioneer to develop a formidable military air capacity during the first world war. The experience of flying during the first world war and the accumulation of planes when the war came to an end in 1918, made Britain, France, Belgium, Netherlands and Germany to plan commercial air routes. Thus was laid the foundation of aircraft industry in Europe.

For many years the U.S.A. was not interested in the development of aircraft industry from a sense of her economic philosophy which discouraged any kind of subsidization or monopoly. Also, she was convinced of the greater need of equipment for surface transport. Her experience in the second world war about the success of air transportation, however, gave impetus to the expansion of commercial flying.

Location Factors

Today aircraft manufactures are carried on to a large extent for civil and commercial aviation services. The vast capital expenditure involved in the making of planes and the highly sophisticated technical and scientific knowledge that is required of personnel making engines, propellers and instruments have so far limited the areas of manufactures to Britain, U.S.S.R., France, West Germany and the U.S.A. Even when these conditions are satisfied, the determination of locations of the industry in a country is a matter of considerable importance. Like

any other industry, the factors of location are climate, topography, labour and transportation, but each factor has its own characteristics in respect of aircraft manufacture. Climate does not directly affect manufacturing operations, and its importance lies in permitting flying tests and out-door work to be carried on. Extreme heat or extreme cold in climatic condition definitely disturbs such operations. Labour needs to be specially trained for aircraft manufacture, and since such training cannot be acquired quickly, a country desirous of developing this industry must have a well-planned system of technical education. So far as topography is concerned, it must be a level land of large area to permit safe landing and take-off. Better still, if such an area is located not near a mountain. Facilities of transportation are essential, not for the finished products of the industry since they can fly to any distance, but for bringing in thousands of components and parts from other industrial centres which are to be assembled for the aircraft. To a large extent, aircraft industry is an assembly business, because there is hardly any plant which can produce all the parts. The locations are mostly raw-material-oriented. Another factor in the location is the political consideration which may dictate a location far inland in a country, not otherwise favourable in terms of economic consideration. The most common feature about the aircraft industry is the need for substantial research as a routine on problems of aircrafts and their engines. This is also a limiting factor.

The use of the aeroplane as a new tool of management has expanded in the U.S.A., U.K., West Germany and Japan. The spread of industry in all these countries has reached great dimensions, necessitating extensive use of light business and executive aircraft to avoid delays on journeys.

The types of aircraft which are manufactured today are many in size, power and carrying capacity from single engine single seaters to jet and turbo-prop for cargo and passengers.

Aircraft Manufacturing Countries

U.S.A. is the leading producer both in respect of number and variety. Specialisation is the characteristic of the industry. Los Angeles and Seattle on the West, Dallas in the

South and Baltimore and Buffalo on the north-west are principal centres of aircraft manufacture.

U.S.S.R. : In order to maintain communication with remote regions of the country, many of which do have surface transport, and for defence requirements, the U S.S.R. has developed a well-organised aircraft industry. The industry is highly localised in Moscow, Gorki, Kazan, Perm, Kiev, Rostov, Komsomolsk and Khabarousk. The country occupies second position in production in the world.

United Kingdom : The industry is characterised by the applications of the gas-turbine aero-engine in all aircrafts—civil and military. The industry produces a wide range of military aircraft. Britain's achievements in the aircraft industry have been quite notable, and her products have main markets in India, Canada, U.S.A., West Germany, Pakistan, South Africa and Australia. In fact, the British aircraft industry makes an important and growing contribution to export earnings. In 1969 exports of new aircraft and parts had a value of £98 million. The important centres of manufactures are London, Hatfield, Dagenham, Portsmouth, Coventry and Wolverhampton. The reason for their concentration in the Midland and South is the presence of better weather conditions than those in the north.

India : The requirements of military aircarft have provided the impetus to develop aircraft industry in India. The progress is as yet very small, and Bangalore is the main centre to start the manufacture.

Automobile Industry

The term automobile is applied to any self-propelled vehicle powered by an internal combustion engine and designed to transport persons and commodities over roads and highways. An automobile may be a car, a bus or a truck. Because of its complex mechanism, an automobile requires for its making high degree of scientific and engineering skill. Its mass production depends on the interchangeability of parts and the assembly line. Consequently, plant lay-out is an essential factor.

No other industry has made so much progress within a period of fifty years in plant efficiency as has been done by automobile industry, introducing frequent changes in the operations and designs, making parts more delicate and efficient, dividing labour on the basis of specialisation and keeping costs economical. At the same time, the survival of any concern in the line means huge capital investment and ready market in the absence of which mortality is inevitable.

U.S.A., West Germany, France, U.K., and Italy produce nearly 80 per cent of the production and assembly of cars and vehicles.

PRODUCTION OF MOTOR VEHICLES (Commercial and Passenger)

(in '000)

	1948	1960	1965	1969
U.S.A. ...	5,268	7,869	10,305	8,224
France ...	198	1,349	1,616	2,458
U.K. ...	508	1,811	1,722	2,182
Italy ...	59	644	1,804	1,595
West Germany ...	59	2,054	2,960	3,598
Japan ...	145	1,028	1,718	4,697
World Total ...	6,670	16,480	24,200	32,948

U.S.A. : The country has the unchallenged leadership in the automobile industry in terms of production, variety and per capita consumption. The industry is mainly concentrated in the Lower Lake area with Detroit as the leading centre. There are various reasons—historical and economic, to make the area so noted. First, the personal whims of Henry Ford to start motor car manufactures at Detroit as it was his home town[8]; secondly, excellent and cheap transport facilities for bringing raw materials and shipping the finished products through canals, Great Lakes and the St. Lawrence as well as by railways; thirdly, nearness to industries, manufacturing parts and components; and fourthly, the industrial character

[8] E. A. G. Robinson. The Structure of Competitive Industry, p. 152.

of Detroit. Two other factors are of external character,—the vast internal market and the availability of trained personnel.

Automobile industry is carried on in Flint, Lansing, Pontiac, Kenosha and Toledo. There is not much integration of the entire industry at any place, and several parts are manufactured by independent concerns for use by automobile industry.

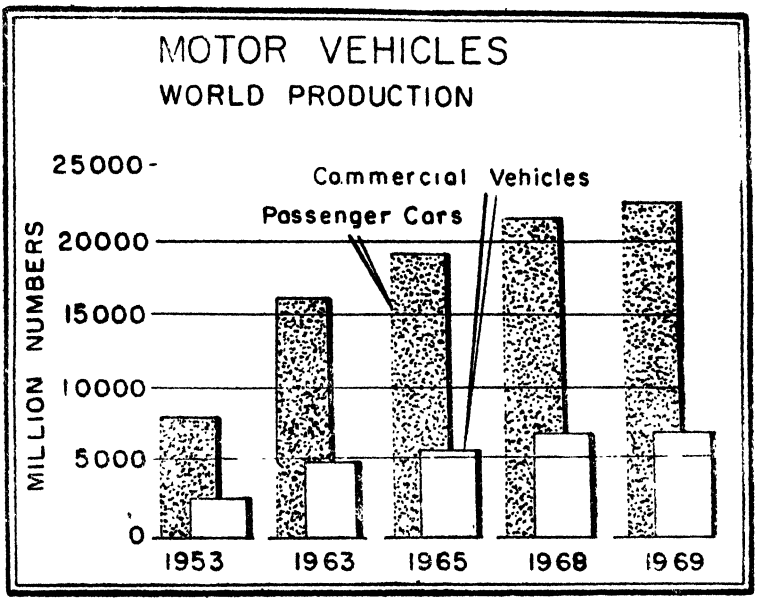


Fig. No. 45. Motor Vehicles. World Production.

In **U.K.,** the automobile industry is mainly located in the Midlands with Birmingham and Coventry as centres and London area, although there are several other organisations throughout the country, which also make different parts. The industry has increased tremendously since 1948. About 1.6 million cars and 385,000 commercial vehicles were produced in U.K. in 1970. About 90 p.c. of the output come from four big companies.[9] The largest market for British cars is the U.S.A. which takes a little less than one-third of total export. This large share is due to the demand for small cars in U.S.A. The other customers are Canada, South Africa and Australia.

[9] The big four are British Motor Corporation, Ford, Rootes and Vauxhall.

Till 1962, the Midlands was the heart of the European motor industry. Today because of the increasing production of automobiles in Northern Italy, Belgium and Wolfsburg, the Midlands position has become very weak. Although there has been some expansion of output in Midlands after 1962, a number of new plants have been started outside Midlands in North West and Scotland on account of the policy of the Government to bring about regional balance for development. Yet these new plants are having a series of problems. The lower wages and the investment incentives in the new sites are being outweighed by labour and the lower productivity. It appears that the local labour with experience of coal and shipyard work can hardly change over to responsibilities of assembly line work.

France is the third leading producer of automobiles in the world. The centres of production are Billancourt, Flins and Poissy. Like U.K., it produces and exports small cars.

Other Producing Areas

Other countries are Italy (Turin as centre), Japan (Tokyo and Yokohama), Soviet Union (Gorki, known as Soviet Detroit, and Moscow), West Germany (Wolfsburg near Hanover for famous Volkswagen, Stuttgart for Mercedes-Benz, Frankfurt, Cologne and Kassel). In 1969, West Germany occupied second position in the production of passenger cars in the world with 3.2 million cars.

Prospects in India

India has a promising future for automobile industry although its present position is very weak. It made about 78,000 automobiles in 1969 at Calcutta, Bombay and Madras. The development of iron and steel industry, the increasing population, the vast size of the country and technological advances suggest the opening of more centres, particularly in places of engineering industries. The two main problems are the high cost of production and the inferior conditions of roads. The high cost does not permit the normal expansion of market, and the roads bring down the working life of a car.

Shipbuilding

A ship is a large vessel made for the purpose of navigating the ocean. There are two kinds of vessels—steam and motor (diesel propelled).[10] Since a vessel must have buoyancy, stability capacity and speed while in the ocean, its making demands (*i*) high technical skill, (*ii*) right kind of structural materials, (*iii*) correct design for the principal dimensions of length, beam and breadth, hullform and general arrangement of the ship, (*iv*) tidal estuaries near the plants for testing and launching of ships and (*v*) large space for construction work on an estuary or river itself in view of the modern size of ships.

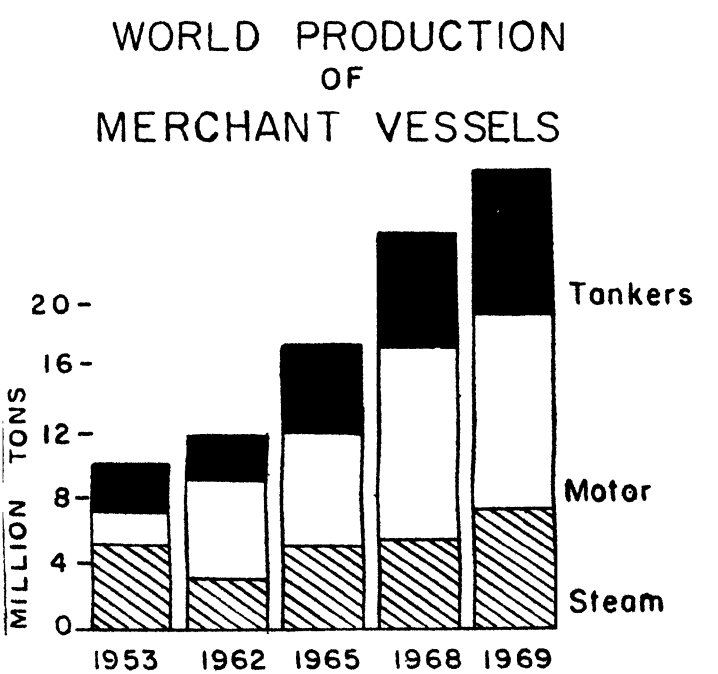


FIG. No. 46. World Production of Merchant Vessels.

The other requirements of the shipbuilding industry are the availability of steel and aluminium for the structures, timber

[10] The diesel requires no boilers and consumes about 40 per cent less fuel per horse power-hour than the turbine. On the other hand, a boiler can supply steam to the turbine with cheaper, less refined grade of fuel oil.

for decks and cabins and engine tools. The modern tendency is to use more and more aluminium to create lighter and stronger hulls. The high cost of this metal, however, limits its use.

Of late much technological changes have taken place in the building of specialised ships to serve the needs of markets more efficiently. These are cellular container vessels, OBO carriers and large bulk carriers, gas and chemical tankers and roll on and roll off vessels. These ships can be turned round in port in a comparatively short time, and this means that container vessels will operate more productively than the conventional types.

The shipbuilding industry is mainly concerned with the making of steamers (passengers and cargo) and tankers. The principal shipbuilding countries are Japan, West Germany, Sweden, U.K., Netherlands, Norway, France, Italy and U.S.A.

MERCHANT VESSELS—TONNAGE LAUNCHED

(In thousand gross tons)

	1960	1963	1965	1967	1969
Japan ...	1,732	2,367	5,364	7,497	9,303
West Germany ...	1,092	971	1,023	1,002	1,609
U.K. ...	1,331	928	1,073	1,298	1,040
Sweden ...	711	888	1,170	1,308	1,295
France ...	594	447	479	553	791
Italy ...	434	492	442	507	464
Netherlands ..	567	377	233	339	596
World Total ...	8,356	8,538	12,216	15,780	19,315

The Leading Shipbuilding Countries

Japan is the world's largest producer of ships, and accounts for about 48 per cent of the world's total production a year. In the construction of tankers, her contribution is nearly 50 per cent. It is interesting to note that as late as 1953, Japan's share was 10 p.c. For the past 15 years, Japan has maintained its world leadership in the shipbuilding industry. In 1970, the industry's output was 10.4 million gross tons out of the world's total of 21.6 million gross tons. It is expected that by 1975, the output will increase to 16 million tons. In the overall

exports of Japan, ships occupy a position of overriding importance, and account for 9 p.c. of the total overseas sales. Ships also constitute the second largest category of exports. The strong factor in favour of the industry is the speed of planning and construction. The prevailing problems of the industry are labour shortage and rising costs of materials. The Japanese shipbuilding industry still faces severe European competition. The speed of delivery and consistency of quality have kept the leadership of Japan unchallenged.

Causes of Growth

(*i*) She has the world's biggest yards for building ships ; (*ii*) her cost of production is comparatively low, partly because of cheap and efficient labour and mainly because of economies in the purchase of raw materials ; (*iii*) she has a number of excellent ports and harbours most of which have space for shipbuilding ; (*iv*) the climate is relatively mild and does not make rivers and estuaries ice-bound in winter ; and (*v*) the ships for shipping companies create demand for ships. Furthermore, the rates of exchange and the government policy regarding assistance to industries are highly favourable.

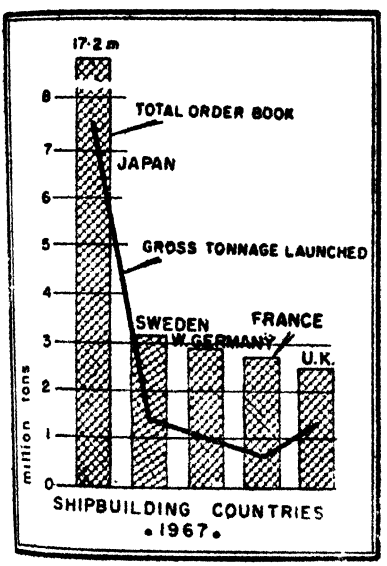


Fig No. 47. Ship Building Countries, 1967

The shipbuilding centres in Japan are Tokyo, Yokohama, Kobe, Nagasaki, Tamano, Kure and Maizuru.

Although there is much difference in the number of ships built in a year between Japan and U.K., the competitive strength of U.K. appeared to become stronger with devaluation of her currency in 1967, which made prices of British ships more attractive by 6 to 8 p.c. And it is this difference in price

which led customers to buy Japan's ships so long. Notwithstanding the devaluation of U.K.'s currency, Japan has succeeded in maintaining this difference in price, which proves beyond doubt Japan's supremacy in labour productivity.

West Germany occupied in 1969 the second position in shipbuilding. Even before 1939, Germany was already a great shipbuilding nation. Although she lost most of her merchant marine during the Second World War, she brought about speedy recovery as soon as the restrictions on the construction of vessels were removed in 1951. The advantages of Germany are her (*i*) tidal estuaries, of the Elbe, the Weser and the Oder, and the Lubec Bay , (*ii*) great iron and steel industry, (*iii*) highly trained technical labour, (*iv*) technological and scientific institutions and (*v*) trading activities. About 50 p.c. of her vessels are tankers.

The shipbuilding centres are Hamburg, Bremen, Kiel, Bremerhaven, Lubeck and Emden.

Britain : In many ways Britain was the pioneer of modern shipbuilding industry. She was the first to introduce steel for iron, and also first to develop steam turbine. In the middle of the nineteenth century, her iron-clad steam-driven vessel ruled the seas of the world. Till 1939, she was the leading shipbuilding country.

Her leadership in shipbuilding before 1939 was due to her tremendous requirements of ships for maintaining trade relations with the different countries of the world, in particular with her Empire, as well as to her early start in the manufacture of machine tools.

The geographical advantages for the shipbuilding industry in Britain are the possession of deep tidal estuaries for launching ships, the iron and steel industry with its subsidiaries and the abundance of coal. In fact the intimate relationship between tidal water and the shipbuilding industry is nowhere as strong as in Britain. The constant demand for merchant ships, fishing boats and naval vessels, and the maritime tradition and inherited skills from the days of wooden ship are also inseparable factors.

From a position as the world's leading ship-builder in the immediate post-war years, British shipbuilding in terms of pro

duction and of order-books has come down to third place in production and fifth place in order-books. In 1969, British yards had constructed 1.2 million tons of ships as compared to 9.3 million tons in Japan and 1.3 million tons in Sweden. In spite of the differences in output, Britain has maintained its reputation as one of the finest builders of specialised vessels.

About 75 per cent of the tonnage of ships built in Britain comes from (*a*) the Clyde basin, (*b*) the north-east coast along the lower reaches of the rivers Tyne, Wear, and Tees and at West Hartlepool and Blyth ; (*c*) the north-west coast of England on the river Mersey and at Barrow-in-Furness ; and (*d*) Belfast, in Northern Ireland, where the largest individual shipyard is located. In the Clyde basin large passenger liners are built Naval vessels are also constructed in this area. The Clyde yards are among the best equipped in the world. The success and pre-eminence of the Clyde bank shipbuilding area rises from the depending and constant dredging of the Clyde estuary which has enabled the port of Glasgow to keep pace with the steady increase in the size of ore and coal in the neighbourhood, and the sheltered position of Clyde estuary. In the North-East coast, the chief centres are South Shields, Newcastle and Wallsend, Sunderland, Hartlepool and Middlesborough. Shipbuilding was started in this region because of the need for vessels to carry coal. The steel production of the area has been an additional favourable factor. All types of vessels are built in the region. Till 1930 the North-East coast region and the Clyde yards were responsible between them some 75 per cent of total British output. On the North-West coast, Birkenhead undertakes naval ship-building, luxury liners and dredgers *Barrow* has been an important centre for construction of merchant vessels, submarine and naval vessels. Although *Belfast* area has no large iron and steel producing region to back it, the necessary fuel and raw materials are easily imported from Scotland and Cumberland. Belfast specialises in the construction of motor ships. The subsidiary centres for ship-building are Goole, Aberdeen, Dundee, Leith, Southampton and Cowes.

The devaluation of sterling has brought about new and expanding activities in the British shipbuilding industry. Not

only has it obtained many orders for ships but it has also offered large volume of employment. The industry is again likely to become fully competitive in the world shipping league. To make British shipbuilding a much more competitive force, there has been a trend towards mergers of ship-building centres. Mergers have already taken place on the Clyde and the Tyne shipyards. Merger have led to bulk buying, group, selling techniques and rationalisation of management and labour forces.

Other Ship-building Countries

Sweden has for many years been a shipbuilding nation with centres at Goteborg and Malmo. *France* has had an important shipbuilding industry, facilitated by the presence of domestic supplies of raw materials and labour and by her ocean commerce. The industry is carried on in both the Mediterranean and the Atlantic-English Channel Coast, and the leading centres are Bordeaux, Brest, Cherbourg, Harve, Marseilles, Nates, Rouen and Toulon. The ship-building industry of *U.S.S.R.* is becoming more important today than at any other time of her history as a result of her determination to make special kinds of naval vessels including submarines, and to extend her commerce through northern sea route. Also, she makes a large number of smaller vessels. The great handicap to her industry is the climate which prevents the construction operations in open yards during winter months along the northern and the Pacific coasts. The Black Sea region is geographically ideal. The shipbuilding centres are Leningrad, Riga, Sebastopol, Odessa and Vladivostok.

Shipbuilding in India : From a slow beginning in 1951, India produced, in 1970, a total of more than 40,000 gross tons of merchant vessels. On the basis of natural resources, climate, river estuaries, transportation facilities and volume of maritime trade, India is well-suited for shipbuilding industry. However, the present development of steel, machine and equipment and technical training as well as shortage of space in good harbours and skilled labour do not presage any substantial expansion in the shipbuilding industry in near future. Visakhapatnam in Andhra is the shipbuilding centre.

Problem of shipbuilding : The entry of new types of ships in world trade is posing a serious problem to the shipbuilders. Container ships and bigger oil tankers and bulk carriers are making existing ships obsolete. For some years, a good deal of replacement work should be available to the world's shipping yards. But as container ships, capable of replacing several conventional cargo liners, and huge oil tankers and bulk carriers take over, the final ship replacement market will become smaller and concentrated.

The Aluminium Industry

Although very recent in its importance, aluminium has ered the consumers' markets throughout the world at a e much higher than any other metal product. The first cessful attempt was made in England in 1825 to make aluinium a free metal from certain ores like bauxite and thereer the reduction process was further simplified but the cost nained too high to permit any commercial use. It was in · U.S.A. that a new process was discovered in 1886 which luced the cost of aluminium so much that it became a com-ercial product by 1892.

The production of aluminium consists of two stages, mely, the preparation of alumina from bauxite and the use pure alumina as raw material for its reduction to aluminium.)out two pounds of alumina are necessary to make one pound aluminium, just as it takes two pounds of bauxite to make ie pound of alumina. As pure aluminium is soft and ductile, rtain alloys like copper, manganese, silicon, iron, nickel and nc are sometimes used to harden it.

The Uses of Aluminium : The transportation and consuction activities have the largest uses of aluminium. Railway rs, automobiles, bus bodies, aeroplane wings, window frames id bridge railings are some of the uses. Also, many parts of ternal combustion engines are made of aluminium. Aluminium is used extensively for making hundreds of household ppliances.

Production : The world production of aluminium is on the ncrease. From 1.1 million tons in 1948, the production

went up to 9 million tons in 1969. The leading producers are U.S.A., Canada, U.S.S.R., Japan and West Germany.

PRIMARY ALUMINIUM PRODUCTION

(In thousand tons)

	1960	1963	1967	1969
U.S.A. ...	1,827	2,098	2,966	3,441
Canada ...	691	652	874	979
U.S.S.R. ...	675	960	965	1,100
Japan ...	133	224	382	569
West Germany ...	169	209	253	263
Norway ...	165	219	362	512
India ...	18	53	94	133
World Total ...	3,690	4,360	7,530	9,039

Producing Countries

U.S.A. has been the leading producer for years in aluminium, and it supplies nearly 48 p.c. of the world's total of raw aluminium. The most important centre is Pittsburg, followed by Witney in North Carolina. The supremacy of the U.S.A. is due to a combination of factors like early start (1888), the development of hydro-electricity near the plants, control over the sources of bauxite abroad in France and South America and the presence and use of fluorspar for the production of artificial cryolite in the reduction of aluminium.

About 50 per cent of the aluminium produced in U.S.A. is consumed by the automobile industry, and another 25 per cent in the aircraft manufactures.

U.S.S.R. : Within recent years, the U.S.S.R. has increased her production of aluminium considerably. This metal was not produced at all before 1930. In 1969, production was 1.1 million tons. The dispersed areas are Kandalaksha in the Kola peninsula, Leningrad, Zaporozhe on the Dneiper river, Yerevan (north-east of Black Sea), Chirchik (south-east of Aral Sea), Kuznetsk in the Kuznets basin, Kamensk-Uralsky in southern Urals and Kranoturinsk in the northern Urals, the last two being the leading producers. In all areas, power is hydroelectricity or thermal.

Canada is the third largest producer of aluminium even hough her domestic supplies of bauxite and cryolite are not sufficient in quantity to warrant such an expansion of the industry. The Canadian location is an example of the excellent benefit that a country can derive to develop *an industry with imported raw materials for foreign markets.* Bauxite from the Guianás of South America and cryolite from Greenland are used to produce aluminium for European markets.

The main advantages of Canada are its enormous water power and the technical personnel and cooperation which it can obtain from the U.S.A. The most important centre is located on the Saguenay river, a branch of St. Lawrence.

Other Producers of Aluminium

Japan, the leading producer in Asia, depends on the possion of cheap hydro-electric power notwithstanding lack of mestic ores. Indonesia is the main supplier of bauxite to an The centres are mostly in the Island of Honshiu.

West Germany has no domestic bauxite, and yet ranks gh in the production of aluminium. Her nearness to the ces of bauxite, her domestic supplies of coal and lignite, and vast domestic market for aluminium are responsible for the velopment of the industry in Bavaria, Westphalia and the hineland.

Australia has the world's largest deposits of bauxite as idenced by the recent discoveries. The major aluminium roups of the world from U.S.A., France and Switzerland have vested more than 500 million dollars for the development of auxite, alumina and aluminium. The involvement of the nternational groups ensures for Australia a good future from xport earnings of bauxite and aluminium metals.

Position of India

India with her large reserves of bauxite, considerable deveppment of hydel and thermal power at appropriate regions, ncreasing domestic market, and a start as early as 1943, still mains a small producer of aluminium. The only limiting actor is the high-cost power. Since the production is a highly

power-consuming process, plants can be located only in areas of low-cost power. Consequently, there are only a few centres in India like Alwaye in Kerala, Belur and Asansol in West Bengal, Muri in Bihar, and Kalwa in Maharashtra. With the exception of Alwaye and Kalwa, the centres use electricity obtined from steam plants. The domestic production can hardly meet 30 per cent of the country's demand for aluminium.

Conclusion

The aluminium industry consumes an enormous amount of electric energy in order to convert alumina—a product of bauxite, into aluminium. It is not merely the availability of power, but its cost which determines the location of the plants. Secondly, few advanced countries are fortunate in the domestic supplies of bauxite and cryolite, but their development of this industry has been possible on account of their geographical locations and transportation facilities in relation to areas where such minerals are available. Thirdly, the conversion of bauxite into alumina and from alumina to aluminium requires large investment of capital, technological skill and skilled labour. All these factors stand in the way of development in under-developed countries. Finally, a certain degree of industrial development within the country to demand aluminium and its products coupled with its trading activities with other countries is imperative. The most characteristic feature of the aluminium industry is the control of world markets by a few international groups which own or enjoy concessions in respect of bauxite mining and alumina refinery in most producing countries.

Textile Fabrics

Textiles refer to making of cloths by weaving, knitting, netting or braiding with component fibres such as cotton, wool, silk and synthetic fibres like rayon, nylon, etc. Clothing is basic human need and from the dawn of civilization, textile have had tremendous impact on the history of every country. The industrial revolution that took place in the early nineteenth century was the result of mechanisation in the textile industry with effects in the wool of Australia, silk cocoons of Japan, the

flax of Ireland and the cotton of Egypt and the U.S.A. Similarly, the introduction of rayon and other man-made fibres has had great impact on natural fibres and their manufactures. Textile products are universally used and whatever affects the

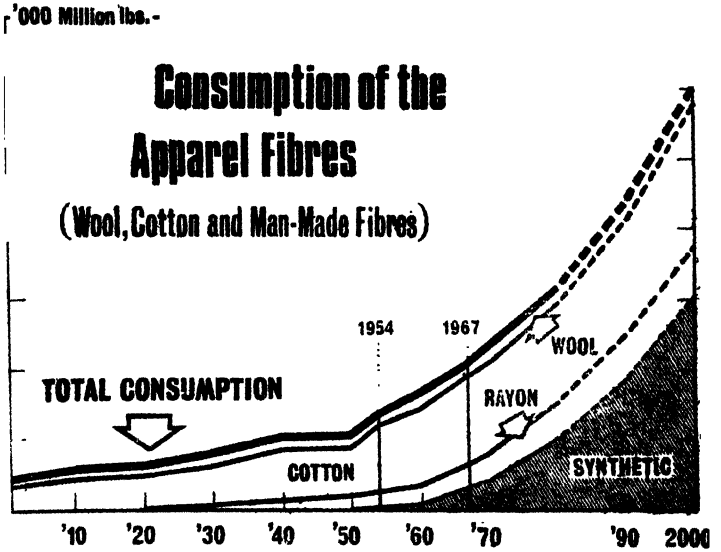


FIG. No. 48. World Consumption of the Apparel Fibres.

sumers also affects the industry. It is no wonder, therefore, t every country in the world is keen to develop textile instry to meet as much domestic demand as possible.

The manufactures of textiles are concerned with spinning d weaving but these may remain as unfinished products less printed and dyed for the purpose of marketing. In no her industry, the task of design about colour and other pects of quality changes so frequently to influence and to be fluenced as one finds in the textile industry. The designs and uality vary from country to country, according to their traditons and standard of living. It is this characteristic of the tex- industry which has determined the extent of markets—both omestic and foreign. Yet, the demand for fabrics will conti- to increase as more and more countries raise living stan-

dards of their people, for today about one-fourth of human population is yet to be fully clothed.

The world market for textile fibres is growing at an average rate of 3 p.c. a year. In 1970, the world production of fibre increased by 12 p.c. The share of man-made fibres rose to 36 p.c. of the total fibres in the same year. U.S.A., Japan, West Germany and U.K. are the four largest producers of man-made fibres and between themselves account for 60 p.c. of the total production.

Cotton Manufactures and Distribution

Cotton manufactures refer to cotton yarn and cotton fabric. Since it is not possible to make fabric without having yarn first, a very large part of the world's raw cotton is used up in spinning mills for making yarn. The entire production of yarn, however, is not consumed for fabrics, because several other articles are also made out of yarn such as thread and cordage.

Cotton textiles account for two-thirds of the total world consumption of fibres because of certain attributes which are as follows: healthy, clean, fresh, strong, versatile and easy sew. In spite of the intensive competition from man-made fibres, cotton still gains the bulk of the business in most developing countries. Thanks to research and development work, the chemical finishing of cotton gives it many easy-care characteristics of man-made fibres like crease-resistance.

There are many countries in the world engaged in cotton manufactures, and their relative importance is measured by the number of spindles and looms as well as the production fabrics.

The production of yarn and the number of spindles indicate only the volume of raw cotton spinning mills, and there are many countries in the world which depend on imported yarn for their cotton textile industry. No country can maintain its position in the world markets for fabrics on the basis of its yarn production, which is nothing but a raw material for the fabrics. However, countries of this type are the largest importers of raw cotton.

The leading producers of woven cotton fabrics are India, U.S.A., U.S.S.R., Japan and China (mainland). U.S.A, pro-

ed 6378 million metres in 1969 compared to 6725 million tres in U.S.S.R. and 7706 million metres in India.

The leading yarn producing countries in the world are S.A., U.S.S.R., India and Japan. The production of yarn 1969 was 1.6 million tons in U.S.A., 1.4 in U.S.S.R., 1,000 tons in India and 498,000 tons in Japan. From 1961 ward, these four countries have retained their order of im- rtance in respect of yarn production. U.K., Egypt and kistan are the other important yarn producers.

In 1968, there were 1.1 million ordinary looms and 1.5 mil- on automatic looms in the world. The largest number of tomatic looms are in the U.S.A. with 238,000 in 1968.[11] the same year, the U.S.S.R., had 214,000 automatic looms 60,000 ordinary looms while India had 28,000 automatic ooms and 181,000 ordinary looms. China occupied the first ce in 1967 in respect of total number of looms in the world 360,000 looms.

Cotton Textiles in Britain

Although weaving and spinning of cotton was quite impor- during the 16th century in U.K., it was not till the second of the eighteenth century after she had introduced anical spinning and weaving that Great Britain became a exporter of cotton piece-goods.

Growth Factors

The leadership of the United Kingdom in the cotton le industry towards the end of the nineteenth century ig from a variety of causes. (*i*) "Her mercantile marine olonial developments placed her in a strong position both btaining supplies of raw cotton and for serving customers" ndia, Ceylon, Burma, East Africa, West Africa, South a, Egypt, Australia and Malaysia which were entirely ndent on Lancashire cotton fabrics. At the same time,

[11] On the basis of 1967 data, the use of automatic looms is extensive S.A. (100%), Italy (50%) and U.S.S.R. (65%). The other countries France (60%), U.K. (43%) Japan (25%) and India (11%). Because variation in the operating efficiency of looms from their variation es, some countries always lead in the production.

supplies of raw cotton came from India, Egypt and Sudan. I fact, these countries were the leading exporters of raw cotton U.K. (*ii*) Her humid climate, abundant supply of water fro the Pennine streams for power and for use in the dyeing, an the coalfields in the same region favoured the establishment cotton industries. (*iii*) Contemporary engineering and metallurg cal development helped to work out new techniques of produ tion. (*iv*) India and other older cotton manufacturing areas wer handicapped by political and economic conditions that existe there, and depended on Britain for cotton products. (*v*) A though France and the Netherlands could have developed th industry earlier, their involvement in politics and war prevente the growth.

There are various causes which provided magnifice opportunities for the location of the cotton industry in Lanc shire. The spinning of cotton requires dampness in the clima without which the threads snap in the processes of drawi and twisting. The moist westerlies give Lancashire the nece sary degree of humidity for spinning. Secondly, Lancashi faces American ports, thus facilitating the import of raw cotto Thirdly, the presence of coal, limestone and water-power important in the early 19th century, when the factory stage industrial development was on its way. Fourthly, the exi ence of a first class port in Liverpool is another great adva age not only for importing raw cotton but also for the exp of finished products. The inherent skill of generations of o ratives, the number of inventions of machinery for cott manufactures in Lancashire, and the foresight and initiat of those citizens who carried out the scheme of the Manches ship canal are the other vital factors which contributed to t growth of the South Lancashire cotton industry. Fina Lancashire's general unsuitability for agriculture also encour ed local people to emphasise more on the manufactures cotton textiles.

The presence of highly skilled labour and the need special care in respect of quality-fabrics produced, howe did not bring home the necessity for introducing autom looms at a time when the U.S.A. and other countries had ready introduced it.

Characteristics and Distribution

The cotton industry in Lancashire is characterised by its tribution according to spinning and weaving activities. The nning districts are located on the slopes of the hills facing st which receive the damp breezes from the Atlantic and in adjoining borderland of North Chesire. The northern half Lancashire has the centres of cotton-weaving like Black- rn, Burnley and Preston. Thus in U.K., the specialisation in respect of process and not products.

The importance of a centre can be measured in numbers operatives employed, in the number of spindles and in the mber of looms.

Characteristics of Textile towns in Lancashire

(*a*) Leading in employment:
Blackburn, Bolton, Oldham, Burnley and Manchester

(*b*) Leading in spindles:
Oldham, Bolton

(*c*) Leading in Looms:
Burnley, Blackburn, Preston, Accrington

(*d*) Leading in trading activities:
Manchester

It is observed that most cotton textile centres in U.K. confined to a small area, permitting common marketing at chester and low transport cost.

Outside Lancashire, the cotton manufactures have deve- in Glasgow and Paisley in Scotland, but as yet they dle hardly 10 p.c. of the production and trade.

Great Britain imports raw cotton from U.S.A., India, A.R., Peru, the Sudan and Brazil. The U.S.A. supplies ut 40 p.c. of her raw cotton and yarn requirements. The cotton goods are mainly exported to Australia, the of South Africa and West Africa, although three decades the markets were truly world-wide.

Present Position

Britain is far behind U.S.A., U.S.S.R., India and Ja in terms of production and spindles and looms used.

The earlier advantages of Britain kept the position of textile industry very strong till 1930. Some competition there from Japan after 1921, but on the whole, the indu continued to maintain its leadership. After 1932, howe three forces started working simultaneously to the detrim of Britain's textile industry: (*a*) more organised export d of cotton manufactures from Japan, (*b*) the emergence of I and China as exporters of cotton goods, and (*c*) the sufficiency drive for cotton goods by many customer-countries British textiles as in Brazil. India, China and Brazil also g raw cotton and have cheap labour. It may be mentioned h that the cotton manufacturing processes are comparati simple, and automatic looms do not call for much skilled lab Underdeveloped countries, therefore, do not find it diffic develop this industry. To these forces must be added th of the U.S.A. France and Italy to the world market aft as competitors of Japan, India and U.K. as well as the mu restrictions in many countries of the world.

The production of woven cotton fabrics went down fr 1704 million metres in 1953 to 661 million metres in 1969. the real impact has been more serious because of the lab being released by the industry. On the one hand, the introd tion of automatic looms had already displaced a certain vol of labour, and, on the other, the declining production f every year some surplus labour. The labour forces have drop to about 50 per cent of 1937 level.

The cotton textiles industry in U.K. has long ceased an expanding industry, and the problems are to find provi for labour that is being released, and to take immediate sures for the improvement of the industry through res so as to retain its place in the world markets as the make superior quality fabrics. U.K. has also the problem of petition by the increased production and consumption of thetic fibres and the increased use of paper in items dir competing with cotton. In 1970, man-made fibres ac accounted for 54 p.c. of the total fibre consumption in

The trade balance of U.K. which showed a steady improvement after the devaluation in 1967, suffered a set back in 1971 because of the imports of woven cotton fabrics from Asia and East Europe and of man-made fibre fabrics from Western Europe. In 1971, the imports of cotton yarns and fabrics in terms of value increased much more than what these were in 1970. One important factor which led to the decline of the Lancashire textile industry was the policy of liberal quotas from Asian countries till recently. Will the position of U.K. cotton textiles improve now that she has agreed to join the European Economic Community (EEC)? The EEC has based its Asian textiles import policy on past import levels into the EEC countries. Britain with its long history of high imports level is likely to suffer from this policy.

Cotton Textiles in the U.S.A.

The United States of America is today supreme in respect of production, persons employed and numbers of looms and spindles. The most striking feature of the cotton textile industry in the United States is the absence of much variation in the volume of production since 1948 when the production was 80 million metres. Till today the production never exceeded this volume nor did it come down below 8010 million metres. There has been much modernisation in operation, resulting in a steady decline in number of employees and increase in the per capita production, but not actual production.

Areas of Production and their Characteristics

There are two distinct areas of production: The New England States in the North-East and the Southern States of North and South Carolina, Alabama and Georgia. The New England States have had the advantage of high humidity, early start in 1790 and the inherited skills of the immigrant workers, the presence of water power and coal, the increasing domestic market and the nearness to Boston and New York—the two important sea-ports. Another important historical factor was the anxiety of the people in New England States to develop an industry like Britain which would give them rich commercial returns for the new nation. The manufacturing centres

are New Bedford, Lowell, Fall River, Lawrence and Providence. The Southern States have the advantage of cotton-growing areas and supply of water and coal in the immediate neighbourhood.

The cotton industry, in the Southern States, however, could not be started before 1840 on account of economic instability, lack of investment capital and managerial enterprise and unskilled local labour. Yet by 1890, the South had been well established in cotton industry. The immediate causes of her growth were cheap labour,[12] lower cost of living, cheaper power, lower taxes and the use of modern machinery.

The cotton manufacturing centres in the South are Charlotte, Columbia, Augusta and Atalanta.

Specialisation by Product

There is specialisation by product in the U.S.A. cotton textile industry. The mills can be grouped as (*a*) spinning, (*b*) spinning and fabric weaving, (*c*) broad fabric weaving, (*d*) spinning, weaving and finishing, and (*e*) finishing. The spinning mills supply yarns to knitters, small weaving units and to establishments making thread, twine and cordage. The spinning and fabric mills are big and produce yarns for their own use to weave into various kinds of fabrics. The broad fabric mills are generally small mills which purchase yarn to manufacture draperies, tapestries, upholstery and other speciality fabrics. The spinning, weaving and finishing mills are the largest in size and these handle the complete process of manufacture. The finishing mills neither spin nor weave, but bleach, dye and print fabrics.

Trade in U.S. Textiles

U.S.A. has been an exporter of cotton textiles for long. The important markets are Canada, Philippines, Indonesia, South Africa, Venezuela, Iran, Thailand, Ceylon and Malaysia. The U.S. supremacy in Canadian market was never challenged by Lancashire even though Canada has been a British Dominion.

[12] It is interesting to note that the cheap labour was white because the negroes were not encouraged to work in factories of the South for many years.

urther, U.S.A. has already taken a strong hold in some of ıe Commonwealth countries like Malaysia and Ceylon.

Cotton Textiles in Japan

Japan has been a very large producer and exporter of ɔtton fabrics in the world. Before the World War II, it :cupied the first or second place in the World both in produc-on and export. Between 1948 and 1956, it was a period of the 'construction of her industry, destroyed as a result of the cond World War. Now, she is the fourth biggest producer cotton goods after the U.S.A., U.S.S.R. and India.

Japan is the largest importer of raw cotton. India, U.A.R.. .S.A. and Peru are the main suppliers. In 1970, she imported 16,000 tons of raw cotton, out of world's total import of 4 illion tons. France, the second largest importer, had in the me year a total of only 284,000 tons. Japan's imports of raw ɔtton constitute nearly 30 p.c. of her total imports. The U.S.A. ıpplies about 60 p.c. of Japan's import of raw cotton.

Causes of Growth

Various factors operated in different stages of her economic :velopment to give the cotton textile industry a predominant ɔsition in the country. *The earlier factors* that laid the founda-on of the industry in 1857 and after were the following:

(*i*) nearness to the sources of raw cotton—such as India and China ;
(*ii*) domestic supplies of coal and water power ;
(*iii*) cheap labour ;
(*iv*) presence of high moistured oceanic climate for spinning ;
(*v*) proximity to vast markets like India, China and other countries of the Far East ; and
(*vi*) government policy to support and finance industry.

Because of the involvement of Britain in the First World 'ar, Japan got the opportunity not only to consolidate the dustry but also to expand it in capacity and diversity for e increased markets of her products. By 1938, her technical aturity along with the development of engineering and chemi-

cal industries, made the position of her cotton textile industry the strongest in the world.

The present development of the industry is due to her highly efficient labour, great improvement in technology, and the shipping and trading activities. There is little doubt that her mills are less modern compared to U.S.A., but on the whole they are highly organised and efficient and far ahead of world level.

The important cotton manufacturing centres are Osaka, Kobe, Nagoya and Tokyo.

Osaka is known as the Mancheser of Japan. The expansion of Osaka has been very great during the last 40 years. It is a large city in Japan with a population of 30 millions. It is situated near the sea coast ; small steamers can bring cotton to the mill-area by canals or rivers. It contains more than one-tenth of the spindles of the country.

The cotton textile industry of Japan is export-oriented. Her cotton goods have markets in most countries of the world which require imported fabrics, and she is the leading exporter of cotton textiles in the world, a position which she held till 1938. Not only is there demand for her cheaper varieties in Asian and African markets, her high grade printed and dyed cloth are imported by U.S.A., U.K., West Germany, Australia and Latin America. Since 1958, the export of fabrics has maintained an upward trend.

The greatest attraction of the Japanese fabrics is their low price *vis-a-vis* quality. The development of cotton textiles in many of the Asian and African countries may no doubt affect her export trade, but her leadership will continue so long she keeps the competitive strength of her industry.

Cotton Textile Industry in India

The cotton textile industry is one of the principal manufacturing industries in India and is the most important branch of textile production. Although making of cotton fabrics is a very ancient industry in India, its beginning on modern lines commenced from 1851 at Bombay.[13]

[13] The first Indian cotton mill was started at Bombay in 1851 by a Parsi industrialist Mr. C. N. Davar. *Report on the Indian Industrial Commission*, 1916-18, p. 72.

Causes of Growth : A number of factors helped the development of cotton mill industry in India. First, India had already made a name in making cotton fabrics on cottage industry lines, and efforts at making fabrics, therefore, on a big scale under modern methods did not come as a surprise. Secondly, the fact that India was a large cotton-growing country brought sanguinity in the efforts. Thirdly, the vast internal market for cotton made the efforts immediately successful. Fourthly, the spirit of nationalism impelled the people to use more and more India-made fabrics in preference to imported stuffs. All these factors were further strengthened by the presence of coal and water-power as well as abundant cheap labour.

The real progress, however, started from 1927, when fiscal protection was granted to Indian cotton textile industry. Today, the industry employs nearly one million workers, helps the country to earn a foreign exchange of more than Rs. 80 crores a year, supports a number of ancillary industries like dyes and chemicals and supplies yarn to handloom industry.

Causes of Growth in Bombay : The cotton mills are widely dispersed, but four areas contain majority of them. These are (*i*) Maharashtra-Gujarat area on the West with Bombay, Sholapur, Poona, Jalgaon and Nagpur in Maharashtra and Ahmedabad in Gujarat ; (*ii*) Coimbatore-Madurai-Salem in Tamil Nadu; (*iii*) Indore-Gwalior-Delhi-Kanpur area covering Madhya Pradesh, Delhi and U.P., and (*iv*) the Hooghly basin in West Bengal.

Cotton Textile Areas in India : Bombay has a special place in the history of the cotton textile industry of India, in view of its role in the development of the industry. The selection of Bombay was favoured by the presence of excellent shipping facilities of the port where raw cotton used to be collected from the valley of Narmada and Tapti for shipment abroad. The port also allowed the import of coal from U.K. and South Africa by sea routes. These two factors assured the supply of raw cotton and coal. The urge to secure for India the profits which accrue from the manufacture of her raw materials became manifest first in Bombay, and the capitalists started investing capital in cotton textiles. Finally, the tolerance of local labour of uncomfortable surroundings of mills as well as comparatively

low wages of mill labour also contributed to the continuing growth of Bombay as a mill centre. Thus, the economic factors mainly decided the location of cotton mills in Bombay. The moist climate of Bombay can favour the spinning process of manufacture, but Bombay is known for weaving fabrics and not much for spinning yarns. Also, the nearness to raw cotton producing areas is not a special advantage of Bombay because there are other centres better located in this regard.

However, Bombay's special geographical advantages are being utilised now because the force of earlier factors is no longer strong. Its location near the great hydro-electric centres, its port permitting export of finished products, its railways bringing raw cotton from Khandesh, Berar and Wardha, and distributing finished products, its climate helping both spinning and weaving operations, its ancillary industries, its local managerial talents and local skilful labour are the modern factors of her supremacy in the industry.

Present Position in Trade : Indian production consists of yarn and woven cloth of many varieties. About 18 p.c. of the production is exported. So far as exports are concerned, the medium varieties account for 70 p.c. and the balance are of fine and superfine varieties. The cotton goods are exported to Sudan, Ethiopia, Nigeria, Kenya, Tanzania, Ceylon, Burma, Afghanistan, U.K., Saudi Arabia and Indonesia. Some of these markets have become uncertain partly because of their own development of the industry as in Ceylon, Burma and Indonesia, and mainly because of keener competition from Japan, U.K., France and U.S.A. Nevertheless, India is the second largest cotton-goods exporting country in the world.

Some Problems of the Industry : Her requirements of long-staple cotton are still met by importing it from U.A.R., Sudan, and U.S.A. In 1970 India imported raw cotton to the extent of about 7 million tons. In terms of quantity, the imported raw cotton is about 10 p.c. of India's total consumption of raw cotton in mills. This dependence is a handicap, more so when it is not impossible to grow such cotton in India. Secondly, both in price and quality, the Indian products are not competitive. It means that there is urgent need for increasing the productive efficiency of the industry. Thirdly, many mills

in India are not of economic size to allow maximum benefit from the use of mechanisation. Fourthly, most mills require modern machines and implements. Only 8 p.c. of Indian looms are automatic. Fifthly, the facilities of railway transport for the movement of raw cotton to mill areas are not adequate, and yet the mills depend for 80 p.c. of their raw cotton on railways for timely arrivals. Finally, the tariff policy has not been always encouraging for the export of cotton goods.

If India is to maintain her present position in cotton markets, not only there must be sufficient fund to bring about modernisation of her mills, she should also develop wider trade contacts.

Wool Textile Industry

Although it is not known when wool was first spun and woven into cloth, its history can be traced back to 4000 B.C. when the Babylonians made garments of wool. In the middle ages the woollen industry was well-established in France and Italy. In the early part of the eighteenth century, it was a leading industry in England. Today, the industry is widely distributed in the temperate regions of the world.

The most important raw material is the wool, obtained from the domesticated sheep. Since the types of sheep vary according to purposes—mutton type, wool type and dual types, all sheep producing countries are not necessarily the producers of raw wool. Argentina, Australia, New Zealand, U.S.A., Britain, Continental Europe, South Africa, Uruguay, India and Northern Africa raise sheep for wool, but only a few countries have developed trade and manufacture in it. In terms of number of wool spinning spindles and looms, U.K., U.S.S.R., and U.S.A., Japan and Italy are the leaders. Of late Federal Republic of Germany has introduced a large number of looms and spindles almost equal to that of the U.S.A.

Classification of Wool : Raw wool can be broadly divided into (*a*) apparel wool and (*b*) carpet wool. Apparel wool is used in U.S.A., U.K., Australia, New Zealand, Argentina and Uruguay The carpet wools are coarse and longer than apparel wools. Most countries in Asia, possessing sheep, raise cloth but there are uses such as blankets, carpets, rugs, draperies,

felt and knit goods. Before the manufactures are started, raw wool is very carefully sorted on the basis of the length and diameter of fibre, washed to remove impurities and spun into yarns. Since the processes demand experience and knowledge about sheep, most manufacturing countries depend on imported wool.

The Principal Producing Areas : Wool is raised in most countries of Europe, New Zealand, Australia and in some areas of Asia, but the principal manufacturing countries are U.S.S.R., Japan, U.K., U.S.A. and France. All the manufacturing countries import raw wool.

PRODUCTION: WOVEN WOOLLEN FABRICS

(In million metres/square metres)

	1948	1960	1965	1967	1969
U.S.S.R. (million metres) .	124	342	365	427	508
Japan (m. sq. metres) .	21	322	341	377	434
U.K. („) .	347	307	270	246	239
U.S.A. (million metres) .	455	262	244	218	209

In the production of yarn, U.S.S.R. holds the first position, followed very closely by U.K. and U.S.A. France, Japan, Italy and West Germany are the other important producers.

WOOL YARN PRODUCTION

('000 metric tons)

	1948	1960	1965	1967	1969
U.K. ...	228	249	250	228	243
U.S.S.R. ...	81	221	236	282	322
U.S.A. ...	331	175	249	189	176
France ...	132	143	130	127	145
Italy ...	—	125	79	69	171
Japan ...	—	110	150	130	173
West Germany ...	38	118	119	71	87

The most important feature in the woollen textile industry is the shifting importance of the areas. While in U.S.S.R. and Japan the industry is expanding, in U.S.A. and U.K. it is

eclining. This is because of the changing nature of one's hold n the international markets as in the case of Japan or because the increasing domestic demand as in U.S.S.R.

The major world organisation for the promotion of wool as commodity is the *International Wool Secretariat Board.* Since s inception in 1937, the aim of the organisation has been to omote and extend the use of wool by means of publicity and search. The I.W.S. Board consists of representatives of three ool Boards of Australia, New Zealand and South Africa, and headquarters are in London. Since 1962, the I.W.S. Board s been engaged in the application of research to industry. The ternational Wool Secretariat is conscious of the advantages man-made fibre and has already made remarkable progress respect of washability. The IWS has also broken itself away om any price relationship with synthetics and established elf as a luxury fibre.

Woollen Industry in U.S.A.

It was started as a household industry to meet family mand in most areas where the colonists settled. The industry s developed along factory lines after 1812 with New England ites as the principal centre. The textile tradition of the early tlers, its damp climate on account of its location on the coast the Atlantic, the shipping facilities at Boston, and availability water-power made New England States the principal woollen ntre. The chief types of wool are worsteds and tweeds.

Of late, a considerable development of woollen industry has en place in the South.

Problems : In spite of her great development in the woollen lustry, imports of woven woollen fabrics come from Britain, pan and Italy, and to a considerable extent has threatened the ition of the industry in American markets. Another problem he growing demand in America for lighter-weight fabrics like on, and this has affected the woollen trade.

The country has put import duties to discourage foreign ports and encouraged the blending of wool with nylon in the king of worsted and woollen goods.

U.K.'s Woollen Industry

The woollen industry is one of the oldest of Britain's staple industires, and has been an important source of wealth since medieval times. About 200,000 persons are employed in the woollen industry. The industry is centralised in Yorkshire.

The geographical causes which led to the localisation of this industry in Yorkshire were:

(*a*) necessary climatic conditions for making yarn ;
(*b*) water-supply from the Pennines noted for washing and dyeing ;
(*c*) availability of wool from sheep-stock of the Pennines ;
(*d*) water power ; and
(*e*) nearness to the ports.

When machines were introduced, Yorkshire did not have any opposition from spinners and weavers. Further, the presence of coal and iron in close proximity could not disturb the industrial character of Yorkshire in the wake of Industrial Revolution. The West Riding of Yorkshire, therefore, remains the principal seat of the woollen industry. The towns principally engaged in this industry are Leeds, Bradford, Halifax and Huddersfield. The other areas are the West of England and the Tweed Valley of Scotland with Selkirk, Peebles and Hawick. There are two main branches of the industry—woollen and worsted. The woollen side of the industry is normally organised on a vertical basis, with each firm undertaking the full process of manufacture from raw materials to finished products. The worsted industry, on the other hand, is organised horizontally—combing, spinning and weaving, each process being done by separate firms. Bradford produces worsted goods, and Halifax manufactures enormous quantities of carpets. At present U.K. is the largest importer of wool in the world. The supply of home-produced wool cannot meet the demand of the industry and 90 p.c. of the wool required is imported from Australia, New Zealand, South Africa and Argentina. England imports more than 60 per cent of New Zealand wool, 15 p.c. of Argentine and South African wool and 25 per cent of Australian wool. The principal customers of British woollen products are Germany, Japan, Sweden, Norway, Denmark, Italy, Spain and U.S.A. The British wool industry has a high reputation

quality and it has never endangered its quality by indis-ıinate mechanisation.

Present Trends :—U. K. was the leading producer of woven llen fabrics till 1959. Both U.S.S.R. and Japan have gone ıd of U.K. Various measures have been adopted to keep the ıstry in a strong position. Of late, blending of wool with :-made fibre has become very popular. The government has ıp a corporation—known as the National Wool Textile Ex- Corporation—to assist exporters and to explore overseas kets for wools. The widespread import restrictions in many ıer customer countries have affected the export of wools. h attention is being paid to improve the quality of products the methods of manufacture through research, and the ıl Industries Research Association is encouraging the in-ry in this regard.

Woollen Industry in India

With an annual production of about 33,000 metric tons of India has developed both cloth and yarn manufactures to ıat extent. There are 48 woollen mills in the country, of h 26 are in the Punjab, 4 in U.P. and 3 in Mysore. Her uction in 1970 was 18 million kg of yarn and 12 million :s of fabrics.

ndian yarn is mostly used in the making of carpets and .ets at Amritsar, Srinagar, Bangalore, Jaipur, Mirzapur and ur.

ndian wool is generally of inferior quality. The finest comes from Bikaner area and is used in the modern mills ıariwal, Jamnagar, Gwalior and Kanpur.

ndian woollen products are exported as carpets, rugs and s to U.K., U.S.A., Canada, Australia and a few other ries in Europe.

roblems in the Industry :—One serious problem of the en industry in India is the need for importing foreign which means a loss of foreign exchange. Every year, she

taken away the importance of silk manufactures in the U.S.A. Nevertheless, there are still imports of raw silk for the production of silk fabrics and hosiery.

The Silk Industry in India

There are three principal areas where raw silk is found: (*i*) Southern portion of the Mysore plateau with the Coimbatore districts of Tamil Nadu, (*ii*) the Murshidabad, Malda and Birbhum districts of West Bengal, (*iii*) Kashmir and Jammu with the neighbouring districts of Punjab. There is also a considerable cultivation in Chotanagpur and Orissa and parts of the Madhya Pradesh of the *Tasar* silkworm and in Assam of the *Endi* and *Muga* silkworm. *Tasar* silk is also obtained from North Bihar. Kashmir is the most important producer of silk in India where silk worms thrive best in the mulberry trees.

Although there are 90 silk factories in the Indian Union, only a few mills use power-driven looms for silk manufactures.

The chief silk-weaving centres are Amritsar and Jullundur in Punjab ; Banaras, Mirzapur and Shahjahanpur in the U.P. ; Murshidabad, Bankura and Bishnupur in West Bengal ; Bhagalpur in Bihar ; Ahmedabad in Gujarat ; Poona, Nagpur and Sholapur in Maharashtra ; Bangalore in Myosre State ; Berhampur in Orissa ; Salem and Tanjore in Tamil Nadu ; Srinagar in Kashmir. The Mysore silk industry produces more than two-fifths of the total output of silk manufactures in India.

Indian silk is in demand in Ceylon, Singapore, Hongkong, Malaysia and East Africa. Of late, America and western countries have become good markets for Indian silk. The possibilities of increasing the export of silk will have to be explored by producing fabrics of oriental design, colour and pattern.

The main problems of the Indian silk industry are the high cost and poor quality of raw silk. Since the cost of mulberry constitutes 60 per cent of the cost of raw silk, efforts are being taken to increase the yield per acre of mulberry.

India exports about a million metres of silk fabrics and earns nearly Rs. 1 crore as foreign exchange.

Rayon Textile Industry[14]

Rayon as a man-made fibre has acquired world-wide importance in a brief span of years. Although the first suggestion to manufacture a fibre to imitate real silk was made as early as 1734 by a French scientist, its foundation was laid in 1891 when a Frenchman took out a patent to manufacture it on a commercial basis. The real progress, however, began after the first World War. It was commercially known as artificial silk till 1938. Rayon is the generic term of manufactured textile fibre or yarn produced chemically from cellulose or having a celluose base. "The cellulose in cotton waste or wood is reduced to liquid pulp by a chemical process and then forced through capillary tubes which change it into a fibre". It is possible to spin and weave this fibre without changing the existing equipment of silk mills.

Rayon is in great demand among the manufacturers, for it may be used with cotton, silk, linen and wool. Although natural silk is lighter in weight, softer, finer, more lustrous and elastic than rayon, the price of the former has been affected to a great extent by the large-scale use of the latter. Rayon has the advantage of uniformity in fineness and staple length. The proportion of waste in its manufacture is very small. It does not compete directly, with food production as the natural fibres do; for, although its basic raw materials are produced agriculturally, limits to expansion tend to be set by the quantities of chemicals and power available. Fluctuations in price are frequent and are less severe than those in the prices of the natural fibres, whose supply is less easily controlled. Since rayon is a product of chemical laboratory, the countries which are scientifically very advanced can only develop this industry. The presence of textile industry facilitates the immediate use of rayon in mills. Another factor is the adequate supply of water near the plants since one pound of viscose rayon requires for its making near 200 gallons of water.

Rayon industry is concerned with the production of (*i*) rayon and acetate continuous filaments, (*ii*) rayon and acetate

[14] Rayon and acetates are man-made fibres but they do not cover non-cellulosics like nylon which is a product of coal, water and air, involving a much complicated manufacturing process.

discontinuous filaments (known as fibro) and (*iii*) woven rayon and acetate fabrics. The leading rayon producing countries are U.S.A., Japan, U.S.S.R., U.K., Italy and West Germany.

RAYON AND ACETATE PRODUCTION, 1969

	Continuous filaments (in thousand tons)	Discontinuous filaments (in thousand tons)	Fabrics (in million metres)
U.S.A.	351	364	1,540
Japan	142	373	1,650
U.S.S.R.	218	223	1,086
U.K.	97	166	538
Italy	93	112	16**
West Germany ...	76	185	637*
World	1,420	2,175	

The U.S.A. is the leading producer of rayon and its products in the world. While its position was almost unassailable in 1948, it has now a close rival in Japan, followed by U.S.S.R. In U.S.A., there are two areas. noted for the manufacture of rayon: (*i*) along the coastal region of the north from southern New Hampshire to Virginia, and (*ii*) in the south comprising North and South Carolina, Georgia and Tennessee. Although the industry was started in the north, geographical and economic considerations have pulled it to the south.

Japan has made a spectacular progress within a period of 15 years from 1948. The industry is the second biggest in the world.

U.K. : There are two main types of man-made fibre manufactures in U.K.: those made from cellulose and those produced by fully synthetic processes from chemical substances. The world's largest rayon staple factory is at Greenfield (North Wales) with an annual output of over 200 million lb. Other large plants are at Grimsby, Preston and Wolverhampton. The important buyers are Switzerland, Sweden and South Africa.

India : The production of rayon in India is on the increase and there are more than 300 factories engaged in weav-

* Million sq. metres. ** In '000 tons.

ing rayon. The production capacity is around 100 million lbs. of rayon filament and 60 million lbs. of staple fibre. As the production is much short of demand, India has to import about 10 million lbs. of rayon yarn and about 1 million lbs. of staple fibre.

Man-made fibres have got a firm hold on the textile markets of the world along with natural fibres like cotton and wool and will account for the major part of the total growth of fibres. Their competitive strength in future will depend on the extent to which they will be serviceable, economical and pleasing to the eyes. For man-made fibres, the plants are to be run at high level of capacity if they are to be profitable. This fact is responsible for a large volume of production from each plant and the need for export at prices lower than home markets. Thus there is a dual price situation. Another fact is that man-made fibres are produced and marketed by large, multi-product, international companies. Naturally, technological changes for the improvement of the fibres are more frequent.

Sugar Industry

There are numerous sources of sugar among plants like sugarcane, sorghum, beets and carrots. The sugar of commerce, however, is derived only from sugar-cane and sugar-beet.

Cane-Sugar : A sugar-cane has 7 to 20 per cent sucrose depending on its quality, 4 to 13 per cent ash and non-sugars, 8 to 16 per cent fibre and 70 to 75 per cent water. The first step in the process of manufacture is the extraction of the soluble matters. The purity of raw juice is determined by the percentage of sucrose in the solubles. Further purification of raw juice is made, and the next operations turn sucrose into crystals by the separation of water through evaporation by boiling. This is raw sugar. Crystals are purified further by defecation with lime and heat. This stage is called sugar refining.

Since sugar cultivation is extensively practised in South-East Asia, Central America and the Carribbean Sea Board, Eastern Africa and Australia, the production of raw sugar naturally is confined to these areas only. Some sugarcane is also grown in Spain in Europe and Florida and Louisiana in

the U.S.A., making cane sugar production possible. Sugarcane is a raw material which must be processed in the heart of the growing areas to get raw sugar first.

The major cane sugar producing region—Central America. produces about 35 p.c. of the world's cane sugar, Asia about 25 p.c., South America about 20 per cent, Africa and Oceania about 9 p.c. each and North America under 2 p.c. The annual average between 1960 and 1970 has been 5.5 million tons in Cuba, 4 million tons in Brazil, 3.5 million tons in India, 2 million tons in Mexico, 1·8 million tons in Australia and 1·5 million tons in the Philippines.

Raw sugar, however, is mostly refined in areas of consumption. That is why many non-sugarcane areas in the temperate regions import raw sugar for sugar production.

EXPORTS OF RAW SUGAR FROM CANE

(In '000 tons)

	1959	1963	1967	1969
Cuba ...	4,951	3,520	4,434	4,500
Brazil ...	616	524	1,004	1,098
Mauritius ...	512	574	580	596
Australia ...	816	1,165	1,274	1,478
Philippines ...	965	1,084	943	1,011

It will be observed that all these exporters of raw sugar are located in the tropics. They normally do not export refined sugar because refined sugar, if exported, would absorb moisture during movements to temperate regions.

The importers of raw sugar are the U.S.A., U.K., France and Japan.

Cuba, which used to influence the world sugar markets by her production of 25 per cent of the world's cane sugar or one-fifth of the world s total sugar till 1952, still remains the largest producer, but her share in the world production of sugar is becoming less, and in 1969 it was hardly 9 per cent. This is because (*i*) cane sugar production has gone up in all countries producing sugar cane, (*ii*) beet sugar production has also increas-

ed sharply, and (*iii*) the cane sugar production has not shown any appreciable improvement in Cuba after 1952. Since cane sugar is the chief source of wealth to Cuba, its decline has had an adverse effect on her economy.[15]

Australia's role as a producer of sugarcane and exporter of raw sugar is of recent development. With the removal of restrictions regarding the cultivation of sugar-cane up to two-thirds of a cultivated area, and with the development of hydro-electricity near the growing areas, Australia has become the second largest exporter of raw sugar after 1966.

Mauritius is a large exporter of cane-sugar. The people of the island virtually depend on the export of sugar. The efficiency and quantity of sugar-cane have been increased because of irrigation. The United Kingdom is the largest individual buyer from Mauritius.

Sugar Industry In India

The development of sugar industry in India is mainly due to the tariff protection it enjoyed from 1962 onward. In 1931, there were only 29 factories with an annual production of 40,000 tons. In 1938, the number of factories was 138, and the production increased to 6 lakh tons in 1939. In 1970 India had 175 mills and the annual production was more than 4 million tons.

The source of sugar in India is sugar-cane, and therefore the mills are located in the growing areas. Broadly, the industry is confined to Punjab and U.P. and Bihar in the north and Maharashtra, Tamil Nadu and Mysore in the South. The important centres are Kanpur, Gorakhpur, Lucknow, Allahabad, Bhagalpur, Muzaffarpur and Champaran. All these centres are in U.P. and Bihar. In the South, the important centres are Belapur and Coimbatore. Amritsar is an important sugar centre in the Punjab.

Sugar is produced in India in the form of refined sugar, gur and khandsari through gur-refining under indigenous methods. About 50 p.c. of the cane produced in India is used

[15] One of the reasons of the decline in production in Cuba is the present strained political relations with the U.S.A. which has always been its principal customer of sugar.

for gur-making. Raw sugar for refined sugar hardly accounts for 20 p.c. of India's total canes.

It is not the shortage of sugar-cane but its poor quality and comparatively high price which have not allowed the Indian sugar industry to acquire competitive strength. Also three is great waste in refining.

India has developed a little export trade to Afghanisthan, Nepal and Ceylon. The prospects for her sugar industry, however, will depend on her ability to reduce the price and increase the production. The government policy encourages such measures.

Beet Sugar

The production of sugar from sugar beet follows the same processes like extraction, purification, evaporation and crystallisation. Since sugar beet is a product of the temperate zone, its production naturally is confined to countries mainly in North America and Europe.

U.S.S.R. is the largest producer of beet-sugar in the world contributing as it does about one-fourth of the world's total. West Germany, France, Poland and Czechoslovakia are the important producers in Europe, each producing 10 p.c. of the world's total beet sugar.

Sugar-cane has certain advantages over sugar-beet inasmuch as its cultivation is easier and the yield per acre is richer. Moreover, it is grown in tropical and sub-tropical areas where labour is very cheap. But there are certain advantages on the side of beet production also. Sugar-beet is grown where the population is dense, capital is easily obtained and good machinery can easily be used. Furthermore, the refuse materials and by-products of beet have great commercial value.

The production of sugar-beet has been influenced by economic and political considerations. Many countries of the temperate zone consider it unsafe to depend on the tropical countries for the supply of sugar. Besides, the development of beet-sugar industry provides employment for many at home. They have, therefore, encouraged the growth of sugar-beet by subsidies or bounties and protective tariffs. The U.S.A. is the

only country which produces both cane sugar and beet sugar on an extensixe scale.

The by-products of sugar industry are very important. Beet pulp and bagasse are promising raw materials in paper, plastics, etc. Molasses is the principal by-product of both cane and beet sugar manufactures, and is a major raw material for the production of alcohol. Rum which is a popular alcoholic beverage in many countries is distilled from cane molasses. There are many other industrial uses of sugar and sugar derivatives on plastics and acid making.

More than two-thirds of total world sugar consumption takes place in countries which produce as well as export sugar. The consumption of sugar in countries which produce and import is growing more slowly than in net exporter-countries. Moreover, the internal production in net-importing countries is also growing.

Although the world trade in sugar has more than doubled during this century, its proportion to total production has gradually declined. The growing trend towards self-sufficiency in recent years in partially producing countries, has resulted in a decrease in the share of sugar traded from 41 per cent in 1961 to 30 per cent in 1967.

The future outlook of sugar industry will depend on the growth of population and per capita consumption. One can ascertain the likely growth of population, but it is difficult to predict the development of per capita consumption. Per capita consumption reaches saturation point at about 40-50 kg and it has a tendency to slow down considerably after a level of 30-35 kg. It can, therefore, be concluded that future development of total consumption in most regions of the world will largely be a function of population. However, in Asia and Africa even a small increase in per capita cnsumption together with their population growth will bring about a great increase in total world sugar consumption.

In recent years, production of artificial sweeteners has been growing in the United States, Japan and West Germany, and has made inroads into sugar consumption. The supplies of artificial sweeteners were equivalent to about 2·6 million tons of sugar in 1970.

Unfortunately prospects of negotiating an international sugar agreement which can support and stabilise the price at a realistic level appear bleak at the moment.

Rubber Manufactures and Synthetic Rubber

The history of the modern rubber manufacturing industry began with the discovery of vulcanisation. For many years, the use of natural rubber remained restricted only because it could not retain both its hardness and flexibility under different temperatures or weather conditions. It was Charles Good Year who succeeded in his experiments in 1839 in which he used sulphur, although he secured a patent in 1844. Some samples of Good Year's "treated rubber" were brought to England by one Moulton in 1841. Thomas Hancock immediately recognised its value and discovered that rubber could be combined with sulphur under heat. He obtained a patent in England in 1843. The term "vulcanisation" was given by Brockedon after Vulcan, the Fire-god. The whole world accepted the term. Between 1844 and 1920, several other improvements were made to reduce the time of vulcanisation and to increase its mechanical strength. Thereafter technological advances have become a common feature of rubber industry.

Today, rubber is the basic material for many industries as it can stand abrasion, be elastic or inelastic, be soft or tough, be resistant to electricity or be impermeable. Above all, it will always come back to original dimensions even after repeated stretchings. These are great advantages, and these can be made according to necessities with the help of sulphur and other ingredients.

The important rubber manufacturing countries are U.S.A., U.K., West Germany, France, Netherlands, Australia, Canada, India, Japan and Brazil. The natural rubber from which rubber is made is supplied by Malaysia, Indonesia, Ceylon, Vietnam, Cambodia, India, Sarawak and Brazil. About 82 p.c. of raw natural rubber in U.S.A. comes from Malaysia and Indonesia. Japan takes 60 p.c., U.K. 68 p.c., Western Europe 60 p.c., U.S.S.R. 90 p.c. and China 60 p.c. of their respective requirements from Malaysia and Indonesia. This dependence on natural rubber from Malaysia and Indonesia on the part of Western Europe

and U.S.S.R. has naturally affected the supplies because of the closure of the Suez Canal after 1967. To a large extent, the shortage of natural rubber in the rubber manufacturing countries in Europe in recent years has caused tremendous expansion of synthetic production.

Synthetic Rubber

Modern rubber industry can have natural rubber, synthetic rubber or reclaimed rubber as its raw materials. The term synthetic rubber means any vulcanizable synthetic polymer having rubber-like properties.

Synthetic rubber was first made in Germany during the World War I when that country was cut off from the natural rubber growing areas by the British blockade. Since the quality of synthetic rubber was still inferior and the supplies of natural rubber were again made available, the synthetic rubber production could not make much headway after the War. All the same Germany and U.S.A. continued to manufacture synthetic rubber.

The real development of synthetic rubber began after 1948. Within a period of 20 years, its production has not only increased but has gone ahead of natural rubber.

PRODUCTION OF RUBBER

(In '000 metric tons)

	1948	1960	1965	1967	1969
Natural Rubber ...	1,550	2,005	2,245	2,634	2,900
Synthetic Rubber ...	570	2,017	3,230	3,690	4,745

Synthetic rubber is a raw material like natural rubber, and the rubber inudstry as such has not been affected in any way by this change-over. Again, the synthetic rubber has not affected the production of natural rubber because differences do exist between natural rubber and synthetic rubber in many respects. All the same, synthetic rubber is getting the larger share of the consumers' expanding market. From 3.9 million metric tons of consumption of natural and synthetic rubber in 1960, the figure went up to 7 million tons in 1969. The percentage

growth in the consumption of natural and synthetic rubber in the world was 8 in 1969 compared to 4 in 1960.

U.S.A., Canada, West Germany, U.K., France, Japan and Netherlands are the main manufacturers of synthetic rubber. The U.S.A. is by far the largest producer. In 1969, the production was as follows in terms of thousand metric tons: U.S.A. 2286, Canada 200, U.K. 273, Japan 527, West Germany 296, France 275 and Italy 138. The world production in the same year was 4.7 million tons.

The United States is the largest exporter of synthetic rubber. In 1960, U.S.A. accounted for 76 p.c. By 1967, U.S.A. share fell to 58 p.c. in spite of an increase in actual production over 1960. It is because some new countries joined the field in competition with U.S.A.

There are broadly six varieties of synthetic rubber: Bunas, nitrile, neoprene, butyl, thiokol and silicon, each with its own characteristics for use and application. For example, Bunas is a general substitute of natural rubber for tyres as it can resist oil, tear and weather.

The basic problem confronting the natural rubber industry is its competitive relationship with synthetic rubber, produced mainly in the industrialised consuming countries. With increasing competition from synthetics, a downward pressure on natural rubber prices has been persisting. The future of natural rubber industry will depend on achieving lower costs of production.

Miscellaneous Manufacturing Industries

Cement Manufacture : The word cement refers to any material that is used as a binding agent for causing diverse materials to adhere. Cements may be (*a*) stone cement as Portland cement, (*b*) substances which form binding joints of certain thickness such as white lead or red lead, and (*c*) cements which require to be used in their coating such as dissolved rubber. However, it is now used in the sense of Portland cement all the world over.

The raw materials for the Portland cement are limestone, chalk or shell and clay or shale. It is essential that calcium

oxide, silica, alumina and ferric oxide must be present in the raw materials.

Cement is now an indispensable product in the construction and road building industries. U.S.S.R., U.S.A., Japan and West Germany account for 50 p.c. of the world's production. In 1953, the U.S.S.R. production was one-third of the U.S.A. The production of U.S.S.R. since then increased considerably and in 1969, the country became the leading producer in the world. Japan is another country where production has gone up from about two million tons in 1953 to 51 million tons in 1969.

WORLD PRODUCTION OF CEMENT

(In '000 metric tons)

	1958	1960	1967	1969
U.S.A. ...	54,830	56,063	64,449	66,627
U.S.S.R. ...	33,308	45,520	84,809	89,740
Japan ...	14,985	22,537	42,494	51,387
West Germany ...	19,390	24,905	31,711	35,079
Italy ...	12,838	16,014	26,271	31,310
France ...	13,629	14,349	24,773	27,697
U.K. ...	11,854	13,501	17,892	17,419
India ...	6,186	7,845	11,309	13,624
World Total ...	263,000	317,000	483,000	537,000

Paper is a felted sheet of vegetable fibres, and refers to not only thin flexible sheets but also to card-board, wall-board and paper-board. The word has been derived from *papyrus*, a word to denote a sheet of writing material that was made in ancient times in Egypt.

The raw materials for paper-making are water, vegetable fibres from woods (spruce, fir, hemlock, birch, poplar and others), cotton and linen rags, bagasse, bamboo, cereal straws, jute fibres and waste paper. The fibres are derived from wood pulp, mechanical pulp (groundwood), chemical pulp (barked logs) and dissolving pulps (purification by alkalis).

The role of paper in the modern world is supreme and absolutely indispensable for knowledge and communication. There are many grades of paper and paper board, based on raw materials from which they are made. Writing paper, newsprint

(papers used in newspapers), book papers, absorbent paper, box board, wall-paper, bags and wrapping papers, and insulating papers are the most common.

The per capita consumption of paper is highest in the U.S.A. (400 lbs.), followed by Canada, Sweden, U.K. and U.S.S.R.

The progress of the paper industry can be judged from the fact that the production of paper has increased to 102 million metric tons in 1969 compared to 22 million metric tons in 1953. Half the production comes from North America. In respect of newsprint, production has increased from 10 million metric tons in 1953 to 18 million metric tons in 1967.

PAPER AND NEWSPRINT PRODUCTION, 1969

(In '000 metric tons)

	Paper	Newsprint
U.S.A.	432,69	2,878
Canada	3,190	7,944
Japan	9,696	1,614
Finland	2,820	1,240
U.K.	4,146	790
U.S.S.R.	5,234	1,051
World	102,334	20,575

U.S.A. and Canada produce about 55 p.c. of the newsprint and 45 p.c. of the paper production of the world. The annual capacity of newsprint production in Canada is 9.6 million tons; output, however, in 1967 was 8.05 million tons. The Canadian paper and pulp industry is having problems from three main factors: rising competition in U.S.A. market, over-expansion of the industry in Canada and extraordinary heavy costs of running in new plans.

In India, rapid progress in paper industry has been made since 1950. The installed capacity rose to 8 lakh tonnes in 1969 as a result of new installation, expansion of existing units and better utilization of equipment. Paper and paper board production in 1970-71 was about 7.2 lakh tonnes. Newsprint production in the same year was about 40,000 tonnes. The supply of raw materials is a source of constant anxiety to the industry. Since available resources of bamboo have been largely absorbed,

the need for greater utilisation of bagasse, hardwoods and agricultural wastes has become urgent. The problem in respect of bagasse is to obtain release of supplies from sugar industry by providing it with alternative fuel. The prospects of mixing hardwood pulp with bamboo pulp are also bright. Formation of a Central Paper Research Institute can be of great assistance to Indian paper industry.

Chemical Industries[16]

The work through chemicals to have transformation of matter and molecular structures of planned design has been going on for many years, but its impact on the well-being of a nation was never so far-reaching as it is today. The chemical industries are considered basic for health, industrial development and defence.

The chemical industries are concerned not only with the manufactures of pure chemicals, but also with many kinds of industrial raw materials that are mixtures of substances. The raw materials of chemical industries are derived from various sources such as mines, forests, sea, air, land, oil, gas and brine wells. The chemicals produced serve as essential raw materials for making thousands of articles like medicines, fertilisers, synthetic rubber, explosives, etc. Chemicals are also used in many industries to improve or preserve the quality of non-durable and durable goods.

The chemical industries produce many kinds of chemicals, and the following are more important: sulphur and sulphur products, ammonia and nitrate acid, caustic soda and soda, chlorine and hydrochloric acid, bromine, iodine and fluorine.

More than 50 per cent of sulphuric acid is consumed in the making of fertilisers and other chemicals. About 66 p.c. nitric acid is used for making explosives. Caustic soda is indispensable in rayon, film, soaps, paper and petroleum. More than 90 per cent of the chlorine goes into bleaching paper and

[16] The chemical industry is most difficult to describe as its range of products and raw materials are diverse to include from plastics to synthetic fibres, from fertilisers to pharmaceuticals and from detergents and dyestuffs to explosives.

textiles and in making other chemicals. Bromine, iodine and fluorine are used mainly in the production of other chemicals.

Although chemicals are made in most countries which have the necessary raw materials, necessary laboratory equipment and highly developed knowledge of chemistry, the U.S.A. leads all other countries in the volume and range of production. The other important producers are Japan, West Germany, U.S.S.R., U.K., Italy and France. Yet chemical is an international industry in the sense that the large concerns have extensive interest in countries other than their own.

PRODUCTION OF CHEMICALS: 1969

(In million metric tons)

	Sulphuric acid	Nitric acid	Caustic soda	Hydrochloric acid
U.S.A. ...	26	5.7	8.7	1.6
U.S.S.R. ...	11	—	1.7	—
Japan ...	7	0.4	2.2	0.3
West Germany ...	4	3.2	1.5	0.6
U.K. ...	3	—	—	—
France ...	4	2.7	1.0	0.1
Italy ...	3.5	1.0	0.8	0.3

The chemical industry occupies a crucial position in the economy of most countries in terms of investment and output. Also, in most countries, the industry has attained a commanding height in the economy and is therefore dominated by international companies. Since many companies of different advanced countries operate internationally the actual level of investment is determined by the investment climate of the other countries.

Mention may be made of the development of chemical industry in the Soviet Union in recent years. The industry is making rapid progress due to huge investments the State has made in the industry. It is planned to develop chemical production further by increasing unit capacities of plants and installations. Since the development of chemical industry in developed countries promotes co-operation between scientists and specialists, the Soviet Union has not been slow in taking advantage of such international distribution of knowledge.

QUESTIONS

1. Analyse the bases of industrial location and give examples of ɔncentration of industries near raw materials, power and market. (I.I.B 1971 ; Cal. B.Com. 1964)

2. Write an account of the cotton textiles industry of Great Britain .ating the centres of manufactures, the sources of raw materials and ie markets to which Great Britain sends her goods.

3. What are the principal seats of shipbuilding industry in the Jnited Kingdom and what are the geographical advantages for the ndustry ?

4. Give an account of the iron and steel industry of Great Britain ting the centres and types of manufactures, the sources of raw mate- and the markets to which the products are sent. (Cal. B.Com. 1964)

5. Discuss the factors of localisation of the cotton textile industry north-eastern U.S.A., and account for the gradual decline of the north- st and ascendancy of the southern states in cotton manufactures in cent years. (Cal. B.Com. 1955)

6. Examine the influence of geographical factors on the localisation iron and steel industry in U.S.A. (Cal. B.Com 1957)

7. Compare the relative advantages which Great Britain and the .S.A. have for the development of steel industry.

8. Indicate the geographical background of the location of iron and industry of the U.S.A. and analyse its advantages vis-a-vis this ustry in West Germany and U.K.

9. Give a geo-economic account of the causes of growth of the panese cotton textile industry.

10. Give a geo-economic description of the cotton textile industry Japan. (Delhi B.Com. 1971)

11. Account for the growth and development of rayon textile in- ry in recent years.

12. "The production of beet-sugar has been influenced by economic political considerations." Mention the countries and explain the ɔrs that led to the development of beet-sugar industry.

13. Analyse with reference to carefully selected regional examples factors which favour the location and development of one of the ɔwing industries: (*a*) Iron and steel, (*b*) Cotton textile and (*c*) Ship ding. (Delhi B.Com. 1964)

14. Give a concise geo-economic account of the Iron and Steel in- ıy in the U.S.S.R. (Delhi B.Com. 1965)

15. Discuss the factors which influence the localisation of iron and l industry. Give examples to illustrate your viewpoint in each case. (Delhi B.Com. 1969)

16. What factors influence the localisation of cotton textile industry ? uss the distribution of cotton textile industry in the U.S.A., mention- the recent shifts in this distribution. (Delhi B.Com. 1968)

17. What is an engineering industry ? State the factors determining development. Give an account of the pattern of world trade in ineering products. (Delhi B.Com. 1971)

CHAPTER VII

TRANSPORTATION

Broadly speaking, *transportation means the action or proces of carrying persons and goods from one place to another* and th methods used for such conveyance. Transportation is the mos important factor in the advancement of civilisation and is th life blood of commerce. The growth of domestic and foreign trade is dependent on it. There is hardly any country which is not dependent on other regions for food or raw materials o manufactured goods. All the countries of Western Europe look to the Americas and Asia for supplies of food and raw materials. Canada, the U.S.A. and Argentina would not have raised wheat if there had been no provision for rapid and cheap conveyanc by land and water, for these countries cultivate wheat mainly for outside markets. By making it possible for a country to enter world market, transport facilities have destroyed the monopolistic position of many producing countries.[1]

Transportation helped colonisation and development many sparsely populated countries like U.S.A., Canada, Soutl Africa and Australia. Several thousands of immigrants fro Europe settled in these countries because of the facilities which transportation offered in covering the distances.

The development of transportation has brought the differen parts of the world in close touch with one another as well shortened the time in covering the distances. Indeed, world of today has become smaller than what it was years ago. Every progress in respect of speed makes it sti smaller. The speed of aircraft has increased beyond imagin tion, while railways also move faster than what they were 30 40 years ago. From 150 miles an hour in 1930, an airc (Jet) now goes at more than 700 miles an hour. Even in th case of shipping, the speed has increased.

[1] The importance of any particular method of transportation to industry will depend on the weight and bulk of raw materials and finish products. The methods of transportation are land, water and ai

Good transportation facilities cannot be developed in every part of the world. The Polar regions, the deserts, and the equatorial regions are some of the areas where modern means of transport are being introduced very slowly because of climatic difficulties. In the Tundra Region dogs and reindeer are employed for drawing wheelless vehicles on snow, while camels are still the main means of transport in the deserts.

In many countries man himself was the only means of transport till recently. In Central Africa, China and India men are still employed to carry loads for short distances. The relief and climate of Africa from the Sudan to the Zambesi are such that it is very difficult to construct roads and railways. Hired porters carry ivory, rubber, palm-nuts and other products of the Savannas. The slopes of the mountains may be too steep for animals, as in some parts of the Himalayas and Tibet, or harmful insects may prevent the use of transport animals as in Central Africa and the Middle Amazon basin. In such regions heavy loads are moved by human labour. It should be noted that employment of men for carrying loads for long or short distances is now considered a sign of backwardness of the country in which men are so employed. This mode of transport is also expensive because the cost of carrying goods to a distance of 150 miles is three times the freight usually charged for a voyage of 800 miles.

Man employs many animals in his service and also employs them as his beasts of burden.[2] The horse is the common transporting animal in the temperate lands. In the hot deserts of the Old World, camels carry heavy loads and can travel more than thirty miles a day. Elephants are employed in India and Burma and parts of Africa to carry loads and they render valuable service in the teak forests of tropical Asia. The yak is the beast of burden in the mountainous regions of Northern India and Tibet, and the mule is serviceable in the mountain areas near the Mediterranean Sea and Mexico. In the north-west of Canada and in Siberia, sledges are drawn by hardy dogs over the frozen snow. The reindeer has been introduced in Alaska and parts of Canada.

[2] Although domestication of animals began in pre-historic times, it is not known in what order horse, donkey, ox, camel and elephants became burden bearers.

The most economical way of using the beasts of burden is with wheeled carts which, of course, require some sort of road. Of all land routes, the road is the most ancient as well as the most universal. A nation's natural resources can best be developed under a system of good roads. Poor roads permit limited intercourse and hinder exchange, and as such keep a country backward.

There is no distinction between a road and a highway, but vehicular routes of local importance are called roads, while those of importance outside the locality as well are referred to as highways. Also, there are international highways although much progress has not been made in many projects for building highways to connect continents and countries.

Modern Development of Roads and Motorways

Roads constitute an important mode of transport in every country. They are almost essential in the collection and distribution of goods in all countries. Wheeled vehicles which use roads may be drawn by animals or mechanical power. When the roads are levelled and macadamised, power-driven vehicles can be employed with full advantage. The use of motor vehicles has led to the rapid building and expansion of highways to connect countries. Regulations and restrictions of individual countries do not, however, permit free flow of traffic in international highways. In most advanced countries, *motorways* have been developed for fast journey and to avoid congestion. The country with the most advanced and also the fastest growing motorway network is the U.S.A., followed by West Germany, Italy and France.[3]

In spite of the great progress in railways, the roads continue to function effectively in the economy of every country. They not only serve trade and commerce, but also feed railways. In fact, their role is both competitive and complementary. For rapid and short distance service, motor vehicles are very convenient. In the case of railways, much delay is caused by terminal services, shunting operations and collection and delivery

[3] These motorways are carefully looked after by the respective governments. Germany imposes heavy taxes on the carriage of freight on motorways.

f goods. But over long distances railways offer rapid, economi-ıl and reliable service, especially in the case of bulky and heavy ɔods. Road transport is more flexible than railway transport, ecause motor vehicles, not being tied to lines, can go wherever ıere are roads. Rural areas can be best served by roads; rail-ay operations are generally unprofitable in these areas as the olume of traffic is not large.

Taxation of motor vehicles and of motor fuel is the princi-al source of highway revenue in almost every country. Trucks re taxed according to ton-miles of freight carried, and buses ccording to passenger-miles covered. Also, in most countries, ıe Central Government has the authority in planning and uiding highway improvement.

ROAD MILEAGE, 1969

(In thousand miles)

U.S.A.	3,800	U.K.	210
Canada	490	India	520
Japan (Km) ...	150	Brazil(Km)	600
France (Km) ...	800	West Germany (Km) ...	200
Australia	600		

U.S.A. possesses nearly one-third of the total road mileage of the world. There are more than 3.8 million miles of roads in country of which 2 million miles are surfaced roads. Motor traffic in the U.S.A. is the heaviest in the world. It has more than 75 per cent of the motor vehicles of the world (one vehicle for every four persons). Road haulage of goods by motor lorries and trucks use more than 16 million vehicles. There is project—Pan-American Highway—which on its completion connect all the capital cities by highways. The longest ute best suitable for motor vehicle travel to be found any-where in the world is the one that goes from Alaska through anada and U.S.A. to the border of Mexico.

Road conditions are not favourable to the development of motor transport in Canada. It has a little above 445,000 miles

of roads of which nearly 20 per cent are earth-roads. These earth-roads are closed to traffic during the long winter. The province of Ontario has the largest road mileage and possesses nearly 50 per cent of Canada's motor vehicles. In general, highways are provincially controlled and maintained.

India has a little over 520,000 miles of roads, but only 150,000 miles are motorable. Considering the size and the population of the country, the road mileage is very poor indeed. Good road communication is essential in a country like India which is predominantly agricultural. It is now felt that to help the country to continue the development of its potential wealth roads must be opened and improved. There are five types of roads in India, namely national and state highways, and district village and urban roads. The national highways (13,900 miles) connect capitals of states and major ports, and constitute the main arteries of communication in the country.

Railroads

Railroads are facilities for transportation by locomotives and other rolling stock over permanent routes. These routes are made of parallel steel rails. *Railroads*[4] *are the most important means of inland transport.* National, political and economic unity of individual countries has been greatly facilitated by railroads. They have also opened up new countries for settlement, which otherwise would have remained sparsely populated. Canada, U.S.A., and Siberia are countries where railroads have opened up new lands.

The immediate effect of the development of railways was the gradual decline of the commercial importance of highways. The revival of the importance of highways came with the introduction of automobiles.

The construction of railroad is influenced by physical factors like climate and topography. Snow may block passes and impede railroads and heavy rainfall may undermine embankments. In the Arctic Zone it is almost impossible to construct railroads as the land is always covered with ice and snow. The heavy rain-

[4] The words railroads and railways are used interchangeably. The word *railroad* is more common in U.S.A., and the word *railway* in other countries.

fall of the Equatorial Region makes the soil unsuitable for the construction of railroads.

The relief of a country directs the course of railroads. It is easy in plains to construct railroads, but the difficulty in mountainous lands in sometimes insuperable. In order to cross the great highland, tunnels are sometimes used. Deep cuttings and long tunnels are avoided wherever possible, because of their high cost. Technical improvements have made railroads not only efficient but also quite safe.

Railroad traffic is being affected by competition with other modes of transport. Trucks, buses and cars on roads have greater flexibility and conveniences compared to railroads, and therefore on short distance, the competition between road and railroad is keen in every country. In fact, in many countries roads have taken already a large portion of the business of railroads. The civil aviation is also challenging by virtue of its speed and comforts the railroads to maintain their share of the long distance passenger business. In terms of passenger-kilometres, the railway traffic is showing steady signs of decline in U.S.A., Canada, West Germany and U.K. in particular and in most advanced countries in general. In developing countries, however, the railway traffic is on the increase because of the comparatively low progress in other means of transport. The change-over from coal to petroleum as a source of power in industries of many countries has affected adversely their railroad traffic because petroleum is carried by pipe-lines whereas coal depends on railroads.

Some Important Trans-Continental Railways

The Trans-Siberian Railway connects Soviet Union with the Far East. It runs from Moscow to Vladivostok on the Pacific, the distance being 5,400 miles. Although this line was constructed for strategic purposes, it carries now a large volume of traffic. The settlement of Central and Eastern Siberia is largely due to this railway system. It has additional value as an alternative route between Europe and Asia on the Pacific for passengers and mails. The line was constructed by the Government for the purpose of facilitating the work of administration in Asiatic Russia. It is a single-track system. From Moscow the line goes to Omsk after crossing the Urals and traversing

the agricultural lands of Northern-Steppe provinces where wheat-fields are prominent. From Omsk the line goes directly eastward, crosses the Obi and the Yenisei and soon reaches Irkutsk and Lake Baikal. The distance between Lake Baikal and Moscow is 3,420 miles. The line then goes from Lake Baikal to the Amur valley and passes through Manchuria and finally reaches Vladivostok. In Manchuria, a southern branch has been opened at Harbin which connects Port Arthur *via* Mukden. Mukden is linked up with Peiping by rail.

The Trans-Caspian Railway connects Central Asia with European Russia. The line runs from Krasnovodsk, on the Caspian Sea, to the heart of the cotton-growing region of Turkestan, throwing on a branch on the Afghan frontier from Merv to Kushk. Krasnovodsk is connected with Moscow *via* Tashkent.

The Canadian-Pacific Railway was built during the years 1882-86. The length of the line is 3,500 miles. This line connects the Atlantic coast of Canada with its Pacific coast. It shortens the journey from Liverpool to China and Japan by 1,200 miles. The line runs from Halifax and St. John to Montreal. From Montreal it goes to Winnipeg, the great wheat centre of Canada. The line crosses the plains from Winnipeg *via* Regina and reaches Medicine Hat in the Rockies. Leaving Medicine Hat, it goes through Kicking-Horse-Pass, and ends in Vancouver. This railway system has played a very important part in the political and economic life of the Dominion. Geographical connditions like distance and climate placed considerable difficulties in the way of colonisation in Canada. Waterways rendered inestimable service no doubt but they were closed to traffic during the winter months. The Canadian-Pacific Railway now permits the scattered population of the Dominion to maintain constant intercourse. Thus the history of Canadian railways is the history of Canada's growth as a nation.

The Chile-Argentina Railway of South America connects Beunos-Aires with Valparaiso ; the distance is nearly 900 miles. This route was opened for traffic in 1910. As there is a change of gauge both at Mendoza on the Argentina side and at Los Andes on the Chilean, the route is useful only for the carriage of passengers and mails. Of the four trans-continental lines in South America none is more important commercially than the

Chile-Argentina line. The interchange of products between the eastern and western zones of the Continent is small.

There is no trans-continental railroad between North Africa and South Africa. There was a scheme before World War I to construct a railway line from Cape of Good Hope to Cairo. As Egypt was then under the influence of the British, the purpose was to have an all-British trans-continental railway in Africa The scheme, however, did not work out. The distance from the Cape to Cairo is 9,000 miles, which is today traversed by rail, river, lake and road. A railway line from Cape Town goes up to the border of Congo via Bulawaya and Elizabethville. From Elizabethville, the capital of Katanga, a river-cum-caravan route proceeds to Lake Victoria, from where a motor road runs to the Nile Gorge. From here steamers maintain regular service to Khartoum. From Khartoum a railway line goes to Wadi Haifa, thence by river-transport Shellal is approached. From Shellal a train runs to Cairo.

National railroads have developed in most countries of the world, but their development has been most unequal. The U.S.A., Canada, U.K., West Germany, France and U.S.S.R. contain more than 80 per cent of the world's railroads. Even in respect of railway traffic, U.S.A. and Canada control one-third of the world's total followed by eastern European countries with another one-third.

Railroads in U.S.A.

The development of railroads in U.S.A. came not only from political considerations, but also from a keen desire to exploit the easily available natural resources and to move them cheaply. Water transportation eased the situation only in areas where it was possible to develop. Thus it was railroad which ultimately met the demand of the country's economy. The first railway line was built in 1825, and the real construction period began in 1869. The U.S.A. has now more than 222,000 miles of railroads, which is about 29 p.c. of the world's railway mileage. Recently there has been a great decline in the passenger traffic of the U.S. railroads due to the competition of airways as well as the fact that many travel in their own cars.

Railroads in Canada

Canada has a little less than 60,000 miles of railroads, the beginning of which was made first in 1835. The original purpose of railroad construction was to foster easy communication between the different scattered communities so that they might form into a political unit. Canada has two great trans-continental systems: the Canadian National Railways and the Canadian Pacific Railway Company. The trans-continental lines were built to connect the east coast with the west coast. The railroad is the most important factor of Canada's prosperity as it helps in providing outlets in export market for large surpluses of agricultural produce. In 1969, about 24 million passengers were carried by railways. The latest development of railroad in Canada is its extension to northern sides in the interest of mining industry.

Railroads in Europe

The railroad systems in Europe have been influenced by the large number of independent countries in a small continent, each developing the system to meet its requirements as dictated by geographical, economic and political demands. There is no uniformity in respect of gauge. The railroads are being competed by other forms of transport—notably automobiles. The greatest density of traffic is in the industrial areas in north-west Europe. However, the traffic is heavier in respect of passengers and not freight in contrast to U.S.A. where it is heavier in freights.

West Germany, because of its location and larger population, has the largest traffic transportation. The total operative length of railways in West Germany in 1969 was 33,773 km, and it carried 1024 million passengers. France has 36,7000 km of railway lines and carries about 1,177 million passengers. The low passenger traffic in France is due to low density of population. In Italy, however, large arrivals of tourists every year account for a greater volume of railway traffic even though density of population is low. The length of railway lines in Italy was 21,900 km.

Railroads in Asia

In spite of the large size of Asia, it has only about 16 p.c. of the world's total mileage. India with her 36,000 miles of railroad has one-third of Asia's total, followed by Asiatic Russia with one-fifth. The railroads in Asia are mostly single-track, and the motive power is steam. In India, new lines are being constructed for shorter distances ; older lines are having double tracks and electrification is being extended along with diesel-electrics. The network of railroad is dense in India, Pakistan and Japan, while it is sparse in Turkey, China and Asiatic Russia. Railroads are almost absent in Bhutan, Afghanisthan, Nepal and Kuwait. Also, a number of adjoining countries do not have rail cennections between them.

Water Transport

From pre-historic times, men have had some form of water transportation either to cross rivers or to cover distance. Today, most of the world's trade is water-borne in view of the progress in navigation.[5]

Water transport may be inland and oceanic. Inland waterways include navigable rivers and canals, while under ocean transport comes seas and oceans and sea canals. Water transport is cheaper than land transport because waterways provide ready-made highways, and the right to navigate them is often free. But water transport is attended with a great disadvantage: it is slow and uncertain.

Rivers are the most important highways of commerce. A river, in order to be useful for navigation, must be deep and free from ice. Swift currents and falls make a river dangerous for navigation. Rivers should have a constant flow of water. The importance of rivers increases when they flow towards ice-free oceans or seas through regions of rich products and dense population. The rivers flowing towards the Arctic Ocean or inland seas have limited and restricted traffic.

[5] Navigation is the process of directing the movement of a craft from one point of water-route to another. Navigation involves use of proper instruments and data for piloting. For long, piloting depended on light-houses, lightships and buoys. More recently, electronic aids have been added.

River Systems of Europe, Asia, Africa, Australia, North America and South America

Europe has a large number of rivers suitable for navigation. Most of the rivers of North-West Europe are navigable and provide an excellent system of waterways. The Alps is the main source of most of the rivers of Europe. The Rhine with 235 miles in Switzerland flows into the North Sea. The Rhone reaches the French frontier 165 miles away from its source in the glaciers and turns south to the Mediterranean. The Inn feeds the Danube and the Ticino flows from the Gattard to join the Po. Among the European countries *Germany is exceptionally fortunate in having large navigable rivers.* What Germany lacks in coast-line, she makes up by her large navigable rivers. And probably in no other country are such big manufacturing and industrial towns to be found on river banks as in Germany. The Rhine, the largest river in Germany and the most important in Europe, has perhaps the most voluminous traffic in the world. Sea-going steamers now land their goods at the river port of Cologne. It is navigable by steamer as far as Maine, Mannheim and Strassburg. The other big rivers of Germany are Wesser, Elbe and Oder. The Elbe is navigable not only within the German boundary but is also easily navigable from Prague to other pats of Czechoslovakia. There are important towns on the Elbe, such as Dresden, Magdeburg and Hamburg. The Oder is also navigable and flows through the rich mining and manufacturing regions of Silesia. Breslau and Frankfurt are two important towns on the Oder.

The rivers of Germany mostly flow diagonally from south-east to north-west. They are all connected with one another by canals. The Weser is connected with the Elbe at two points —Magdeburg and Hamburg. The Hansa Canal gives direct water communication of the Ruhr coal-fields to Hamburg. Ludwigs canal connects the Danube with the Maine, a tributary of the Rhine.

France has made much progress in the extent and utility of inland waterways. To secure the maximum benefit through inland communication by water, the most important rivers have been joined with one another. The rivers are navigable except

in their upper courses. The Rhone, which is 500 miles long, is of little importance, but the Seine is a first-class water-way. The Seine with the tributaries, the Youne, Marine and Oise, rises in the hills of Burgundy and flows northward to the English Channel through the Paris region. The river is navigable and provides valuable traffic. The Loire, which flows to the Bay of Biscay, is navigable as a commercial water-way. The Dordogne and Garonne are navigable and have important traffic.

There are many large navigable rivers in Soviet Union totalling more than 65,000 miles. These are the Dvina, Volga, Don, Dneiper and Dneister. They mostly flow either to the Arctci Ocean or to the inland seas like the Caspian, the Baltic or the Black sea. This is a serious defect because the north is ice-bound during winter and closed to navigation, and the inland seas have no outlet. In spite of such defects the Russian rivers are very important for domestic and foreign trade. The Volga is the second important river in Europe. It binds the trade of the south with that of the north in Russia. The Volga handles about 25 per cent of all the inland water-borne freight. But as it flows to the Caspian Sea—a land-locked sea, its navigation is important only between local centres along its course.

River-transport in Australia

Australia is deficient in waterways. Her river-system consists of small streams flowing from the highlands to the coast. Her eastern rivers are navigable for short distances during the wet seasons only. The two most important rivers are the Murray and the Darling. The Darling rises in the Eastern Highlands and flows for over 900 miles over the gentle gradients of the plains. In winter and spring, the river is almost dry. The Murray rises in the Australian Alps and is fed by the melting snow as well as by the copious rains of that part. The Murray and its tributaries are very important for irrigation, which consists in damming up the rivers at convenient places and holding back the waters for use in channels which lead to the fields. The Murray was at one time important for navigation but now, because of the motor lorries, the water-borne trade is meagre. The south bank of the Murray is the boundary between Victoria and New South Wales.

River Transport in Canada and U.S.A.

In the Lawrence and the Great Lakes, *Canada has the most magnificent inland waterways in the world.* In addition to this wonderful system, there are many large lakes and thousands of miles of navigable rivers. There are three chief hindrances to navigation on the St. Lawrence and the Lake system: (1) frequent fogs near the mouth, (2) ice in winter, (3) rapids and falls. Searchlights and horns are used to avoid accidents arising out of fogs. During winter ice-breakers keep the river fit for navigation. The obstruction caused by rapids and falls has been successfully removed by deepening the river and constructing canals. The more important of the other navigable waterways of Canada are Red River, Albany, Saskatchewan, Mackenzie and Yukon. The less important rivers are Fraser, Skeena and Columbia. With the exception of the St Lawrence and the Great Lakes, the traffic on the rivers of Canada is rather of a local character.

Notwithstanding the fact that U.S.A. does not depend much on waterways for the movement of goods, the rivers furnish a network of ways covering nearly 20,000 miles. The two most important rivers are the Missouri and the Mississippi. The Mississippi is navigable for 2,000 miles from its mouth to the port of St. Paul. The Upper Mississipi carries an immense volume of traffic throughout the year, but the Lower Mississippi is scarcely used. The great defect of the river is that it suffers from heavy floods. The Ohio, a tributary of the Mississippi, is navigable up to Pennsylvania and carries much coal traffic. The Missouri, which joins the Mississippi at St. Louis, can be navigated almost to the foot of the Rockies. It is also subject to great floods. The proximity of the sources of the Mississippi and the St. Lawrence has made it possible to connect them by means of canals.

River Transport in South America

In respect of size and the number of States, South America is not fortunate so far as the waterways are concerned. The rivers flowing to the west coast are of little use for navigation. The Amazon is the longest river of the Continent which can provide with its tributaries 50,000 miles of safe navigation in the

wet season and some 20,000 miles in the dry season. The tributaries of the Amazon are also navigable. Up till now the Amazon system is of relatively little use, because the region through which the river flows is densely forested, scantily populated, undeveloped and largely unexplored. The Orinoco which flows through Venezuela is a long waterway. But the most useful in South America is the Parana system which penetrates the heart of Argentina, Paraguay, Uruguay and South Brazil. In the southern side of South America the river Rio Negro drains the sheep-rearing land of Patagonia.

River Transport in Africa

Although Africa does not have many rivers, those which are there are of considerable significance either for irrigation or transport or both. The Nile is the most important river in north-east Africa, but its great defect is the succession of cataracts. In its upper course the Nile has rapids and falls ; in its middle course there are cataracts. It is navigable in the delta and in its lower

The rivers of South Africa are of little use for traffic. The Zambesi is navigable for 250 miles, while the Limpopo can navigated only for a short distance. The Orange is not navigable. In tropical Africa, the Congo provides a magnificent system of waterways. It rises in the highlands between the lakes Tanganayika and Nyasa. But at several places navigation is interrupted by rapids and falls. The Ubangi, the chief tributary f the Congo, can be navigated almost to its head. In West Africa the Niger is easily navigable for 500 miles and in the wet season navigation is continued further. The Gambia is navigable for 200 miles from its mouth. In Africa rivers will continue to e very useful for commerce for some time more. It is quite likely that in future the great lakes of the Continent will provide valuable waterways.

There are many rivers in Asia, but all of them are not navigable. Broadly, India, China and Burma are provided with rivers which are navigable.

River Transport in Asia

Northern India is especially endowed with three large navigable rivers which provide more than 20,000 miles of waterways.

These rivers are the Ganga, the Brahmaputra and the Jamun The Ganga can be navigated by steamers as far as Kanpur fro its mouth. This river flows through the most densely pop lated and fertile plain of India and naturally commands muc traffic. Before the development of railways the Ganga was considerable importance for the movement of goods and pe sons. The development of railways has greatly reduced tl importance of steam navigation, specially in the Upper Gang The Lower Ganga is even now very important, and there traffic all the year round. The Brahmaputra flows throug Assam and Bangladesh, and is navigable as far as Dibrugarl Its tributary, the Surma, has made steam navigation possibl in Sylhet and Cachar. The Indus in Pakistan is navigable b steamer up to Dera Ismail Khan in the North Western Frontic Province, 800 miles inland. The river mostly handles whea cotton and wool. The frequent shifting of its bed and the form tion of sand-bars have caused steam navigation in the Indus t be neglected.

Burma is very fortunate in having a large number of nav gable rivers. The Irrawady, the most important and the larges is navigable by steamers for more than 500 miles from its mout and country boats can proceed farther.

In *China,* the rivers have made a significant contributic to the development of commerce. The three great rivers, Hwang-ho, the Yang-tse-kiang and the Sikiang, cross the cour from west to east. China's greatest river is the *Yang-tse-kian* 3,200 miles in length and the most important water-way navigation in the country. It drains an area of 756,500 squ miles. It is doubtful whether there is another equally extens region of wealth in the world where the people depend solely upon a single artery of traffic and upon one entrepo do the inhabitants of the Yangtse basin. About half of population of China live in this fertile area, utilizing the ri its tributaries and its network of canals as their chief means communication. The Yang-tse-kiang rises in Tibet, and wi its tributaries drains the heart of China. It is navigable steamers up to the port of Hankow, 680 miles up, for loadi tea and other products for Europe and America. The Yan can be divided into three sections. The first section begins eastern Tibet where the river has a torrential course and

[illegible] this river is called the Kinsha
ıng, the River of Golden Sands. In its second course, the
ngtse becomes semi-navigable near Suifu, 1,630 miles from
sea and continues through Szechan and the gorges of
:stern Hupei. The province of Szechan is one of the richest
as of China in silk, opium, cotton and minerals.
nsequently, the river traffic on this part of the Yang-tse-
ng is very brisk. The third section is from Ichang to the
—a distance of one thousand miles. As the depth is between
and 100 feet, the navigation is easy. The *Hwang-ho* also
es in Tibet. It is of little use for navigation as it is swift
d shallow. Its name (which means 'Yellow') is due to the
our imparted to it by the yellow loess soil over which it
ws. The river sometimes causes so much damage by floods
ıt it is called 'China's sorrow'. The *Sikiang* rises in the
ghlands of Yunan and has a fairly direct course eastward to
mouth. It is navigable for the greater part of its course.
ıe *Pei-ho* is important for communication and can be navigat-
up to Tientsin.

Ocean Transport

odern international trade is mostly sea-borne. Ocean
ays link different countries together and develop foreign
merce. Ocean transport is cheaper than land transport
ause the long highways on the seas are always ready for
The countries surrounded or touched by oceans are more
urably placed than those devoid of seaboard.

The importance of shipping lies in the fact that it gets
d in the chain of distribution of goods as a link. But
involvement is a very loose one inasmuch as it has no share
e distribution beyond a particular point of time when the
ls are in transit. While this is true of all transport system,
rs expect much more services from shipping in view of
latter's world-wide shipping connections. This means that
tructure of shipping must have to be developed in line with
cial requirements of trade and passengrs.

terms of total tonnage of fleet, the world's total in 1968
l million gross registered tons. Liberia in Africa had
illion tonnage, the highest in the world in 1968. Yet

Liberia's tonnage was only 1 million in 1959. This large tonnage is on account of oil tanker fleet. U.K. is the second largest, followed by Norway and Japan.

The British shipping industry is a large, powerful, modernised and competitive force in designing, managing and operating ships. All sectors of British shipping adapt themselves in a variety of ways to the new demands and circumstances.

MERCHANT SHIPPING

(Thousand gross registered tons)

	1963	1968	1970
U.S.A. ...	22,430	19,668	18,463
U.K. ...	21,490	21,921	25,825
U.S.S.R. ...	6,958	12,062	14,832
Japan ...	10,813	19,587	27,004
Germany (W) ...	6,888	6,528	7,881
Norway ...	14,477	19,667	19,347
Liberia ...	11,391	25,750	33,297
Italy ...	5,708	6,624	7,448
WORLD TOTAL ...	153,000	194,152	227,490

It will thus be observed that the world fleet increased by more than 66 million tons between 1963 and 1970. There has been spectacular progress in U.S.S.R., West Germany, Norway and Japan. In 1969 the Soviet mercantile marine comprised 1,380 vessels of 13 million tons, of which 80 p.c. were built between 1957 and 1968. The tanker fleet represented about 25 p.c. of the total fleet, obviously because of the increasing traffic in oil all over the world.[6] The world oil tanker fleet in 1969 numbered 4,800 vessels of 76 million gross tons, of which U.K. owned a fleet of 8.3 million tons.

Ocean steamers may be classified into three classes: liners (*b*) cargo steamers and (*c*) tankers. The essence of a liner system is the maintenance of regular routes and ports of sailing on advertised dates. A liner may be of a passenger service or of a cargo service. A passenger liner service is primarily for the carriage of passengers and mails, and is, therefore, designed both for luxury and speed. A cargo liner, which

[6] There is hardly any equilibrium between demand for shipping and its availability. A large amount of tonnage remains unutilised.

arries large quantities of merchandise, usually operates on routes vhere speed is not the main requirement.

When a cargo steamer has no regular route or time of sailing nd goes wherever cargo is to be had, it is called a tramp steamer.

Although steamers may cross the oceans in every direction, here are certain definite sea-routes which are followed because f their freedom from navigational hazards.

Mention may be made of containerisation which is referred o as change-over to unitised cargo. The containers have now ecome established as the accepted mode of transport on many uropean and world-wide routes. Britain is the biggest user of ea borne container traffic in Europe. The U.K.'s total unitised raffic in 1970 was 16.6 million tons. The main ports of Europe, J.S.A., Japan and Australia are showing an increase in container raffic since 1968. Containerisation requires replacement of raditional transport, and this means large investment of capital. The progress is, therefore, on the whole, slow.

The Principal Ocean Routes of the World

I. *The North Atlantic Ocean Route* has the greatest traffic f all ocean routes. Nearly one-fourth of the tonnage of the vorld's merchant vessels serves this route. In volume and variety f cargo, this route far exceeds any other. This route connects he ports of Western Europe with those on the east coast of North America. These two regions are the most populous and highly developed regions on the earth. North America and Western Europe are the world's greatest producers of goods of quantity and diversity. Ports on the western coast of Europe are Glasgow, Liverpool, Manchester, Southampton, London, Rotterdam, Bremen, Bordeaux and Lisbon. Ports on the eastern ast of the U.S.A. are Quebec, Montreal, Halifax, St. John, oston, New York, Baltimore, Charleston, Galveston and New rleans.

Emigrants and fishermen from Europe first brought this ute into prominence. For many years, traffic along this route nsisted of emigrants and manufactured goods moving east-rd, and food and raw materials moving westward. Today, wever, there is a substantial west-bound traffic of manufac-tured goods and tourists from North America.

The presence of icebergs along its northern course and the dense fog near Newfoundland are the weaknesses of the route.

The exports of Canada and the U.S.A. to Europe are timber, fish, wheat, raw cotton, tobacco, oil, machinery and vehicles, metals, paper and chemicals.

II. *The Panama Route* connects the Pacific with the Atlantic. The Panama Canal has not only opened several routes, it has also altered certain old ones. Before the construction of the Canal the only sea-route between the eastern and the western seaboards of the Americas was by Cape Horn. The trade relations between the Far East and the eastern coast of the Americas were then maintained by the Suez Canal. The important ports of call along this route are Colon, San Diego, Vancouver, Prince Rupert, Collao and Auckland in New Zealand.

The Panama Canal serves mainly the eastern coast of the U.S.A. in its trade with Australia, New Zealand, Japan, China, and the western parts of South America and North America.

III. *The Suez Canal Route* is second to the North Atlantic in respect of volume of traffic.[7] It commands the markets of Eastern Africa, Iran, Arabia, India, the Far East, Australia and New Zealand. In fact, the route passes through the heart of the world and touches more lands and serves more people than any other route. Throughout its many ports of call, it reaches about three-quarters of the total population of the globe. After crossing the Red Sea, the route follows two directions—one along the eastern coast of Africa to Durban; another to farther east—to India, Australia, etc. Ports of departure are London, Liverpool, Southampton, Hamburg, Rotterdam, Lisbon, Marseilles, Genoa and Naples. The ports of call are Aden, Bombay, Calcutta, Rangoon, Penang, Singapore, Manila, Hongkong, Perth, Adelaide, Melbourne, Sydney, Mombasa, Zanzibar, Mozambique and Durban.

This route is mainly served by the British, Japanese, Italian and Indian companies.

Along this great highway the Asiatic countries send raw materials and some food products to the western markets and

[7] Since 1967 the Canal has remained closed. The closure has severely affected the trade between Asia and Europe because of the longer distance via Cape route. About one-fifth of the total of cargo in world sea-borne trade normally passed through the Suez Canal. More than 50 p.c. of Europe's petroleum import came across the Suez.

ecceive in return manufactured articles. The products of the Far East are rice, tea, sugar and silk ; those of India are coffee, tea, pig iron, manganese ore, jute goods, indigo, spices, cotton, teak, silk, skins, leather and oil-seeds and those of the Middle East are petroleum, coffee, and dried fruits. From Australia meat, timber, wheat, flour, fruit, wool, butter and wine are sent. Pakistan sends jute, tea, hides and skins.

IV. *The Cape Route* connects Western Europe with the western and southern parts of Africa. The route also serves Australia and New Zealand. Many European colonists going to Australia and New Zealand from Europe avail themselves of this route, for it is cheaper than the Suez route. The chief ports on the European coasts are London, Liverpool, Cardiff, Southampton, Swansea, Lisbon and Ascension. The ports of are Port Elizabeth, East London and Cape Town in South Africa and Adelaide, Melbourne, Sydney and Brisbane in Australia.[8]

V. *The South Atlantic Route* leads to West Indies, Brazil to Argentina. The chief ports of call on the route are Bahia, Rio-de-Janeiro, Santos, Montevideo, Buenos Aires and Kingston (Jamaica), Havana, Vera Cruz, Tampico, Pernambuco, Rosario. The exports along the route are sugar, bananas, raw cotton, mahogany, tobacco, coffee, grain, wool and meat, while the imports are manufactured goods.

This route maintains trade connections between Europe on the one hand and West Indies, Caribbean Seaboard, Brazil, Uruguay and Argentina on the other.[9]

VI. *The Pacific Routes* connect the western seaboard of South America with eastern Asia. There are two main routes: the shorter route goes along the Aleutian Islands, and the other one which is longer goes via Hawaiian Islands. The Panama Canal has also made the Pacific Ocean prominent as a highway of commerce. This route, which is of growing importance, connects Australia, New Zealand, Japan, Thailand and China with

[8] The volume of traffic in the Cape route is comparatively small and will remain so till the countries in the western part of Africa become commercially and industrially advanced. Since 1967, however, the traffic on the route has increased on account of the closure of the Suez route.

[9] There is little trade between South America and Africa along this route because both the continents have more or less similar ranges of production.

America. The great development of industries in Japan an China has further increased the importance of the Pacific rout

On the Atlantic side, Seattle, San Francisco, Los Angl and Portland are important, while on the Asiatic coast, the chi ports are Yokohama, Kobe, and Hongkong.

VII. *The North Sea route* through the Arctic ocean pr vides a communication between the European U.S.S.R. and t Far East along the Soviet coast. This Arctic shipping lir across the top of Siberia was till recently strongly guarded. August, 1967, a cargo ship made a journey with 2000 tons merchandise from Hamburg to Yokohoma along this route only 28 days. The use of this route now by Soviet cargo vesse has become routine in recent years. Ice is no doubt a probl but modern ice breakers can now keep this route open for days a year. There is a saving of 4000 miles distance fr London to Yokohoma via Northern route as against Suez rou

The North Sea route is likely to affect the traffic of t Suez so far as trade between West Europe and Far East concerned.

CANALS AND SHIP CANALS

Canals are artificially constructed water-channels us mainly for navigation. Canals are mainly dug (*a*) to short long voyages by connecting seas, gulfs or oceans, (*b*) to ma inland centre ports, (*c*) to avoid falls and rapids of rivers, an (*d*) to enable a country to handle its own traffic within own borders when its rivers flow through foreign lands. Can are classified as ship canals and boat canals. As the nam suggests, a ship canal is meant for ocean-going vessels. boat canals are meant for boats and barges within a count as in Germany and U.S.S.R. Ship canals are of large dir sions and can admit vessels of great size. As they are usua cut across isthmuses, they greatly reduce the distance by between certain countries. They also place great inland tow in direct communication with the sea. Ship canals are of types: sea-level canal and lock canal. Sea-level canals two branches of an ocean on the same elevation, while lo canals are constructed when there is difference in elevatic between the two oceans.

THE SUEZ CANAL

The Suez Canal—one of the great international waterways of the world—cuts across the Isthmus of Suez and provides navigational facilities between the Mediterranean Sea and the Indian Ocean. The history of a canal connecting the Mediterranean with the Red Sea dates back to thirteenth century B.C. when a *Nile-Red Sea* canal is known to have been in use until the end of 8th century A.D. From 16th century onward one or other of European powers became interested in the idea of either re-opening the old waterway or cutting a new one from the Mediterranean. In 1834, Ferdinand de Lesseps, a member of the French Consular service at Alexandria, became interested in the Suez Canal scheme. In 1854, he discussed the project with the Viceroy of Egypt (Khedive) and got his approval. A concession to run for 99 years from the date of the canal's opening was granted to de Lesseps, authorising him to form an International Company for the purpose of constructing a waterway. The excavation was started in 1859 under de Lesseps, who took full ten years to construct the canal. It was opened in November,

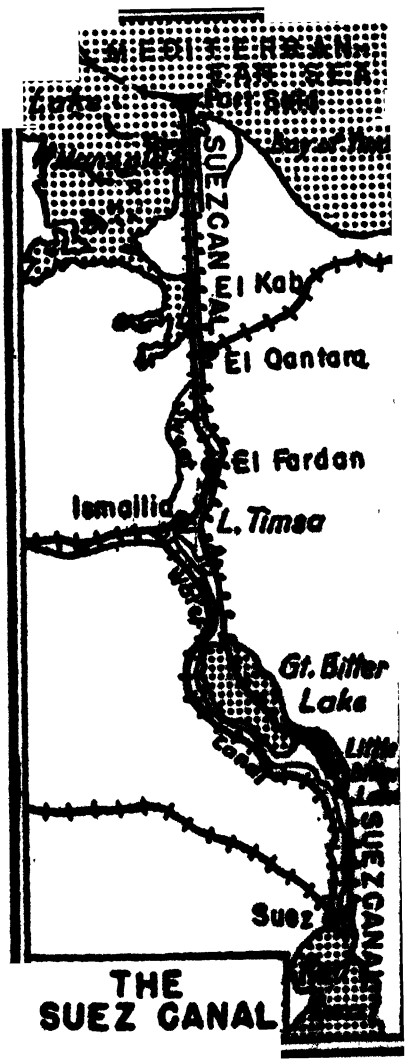


FIG. No. 49

1869. It is 150 km. long with a minimum width of 197 feet and a depth of 33 feet. The canal is at sea-level throughout.

The Canal Route

As a ship enters the canal from the Mediterranean sea, it will pass *Port Said,* one of the greatest ports in the world and proceeding south will enter Lake Tunisa on the bank of which is the city of *Ismailia.* From Lake Tunisa to Suez city, a ship will pass through Great Bitter Lake and Little Bitter Lake.

The opening of the Suez Canal had tremendous effect on world commerce and politics as it brought into direct contact the countries located on either side of the canal's terminal ports and opened up to western countries a new route to Africa, Asia and Australia. It is no longer necessary to circumnavigate Africa either from Europe or America to reach Asia.

Advantage of the Canal

RELATIVE ADVANTAGES OF THE SUEZ CANAL TO EUROPE, ASIA AND AUSTRALIA

	Km *via* Suez	Km round Cape	Days in round trip *via* Suez	Days in round trip *via* Cape
London to Persian Gulf	9,400	16,300	37	65
London to Mombasa ..	9,014	12,675	30	43
London to Bombay ..	9,260	16,020	31	54
London to Calcutta ..	11,933	16,450	40	57
London to Colombo ..	10,702	15,350	34	52
London to Singapore ..	12,240	16,075	41	58
London to Penang	11,950	16,285	40	56
London to Sydney, Australia ...	16,630	18,450	58	62
London to Wellington, N.Z.	18,650	19,250	63	66
London to Hong Kong ...	13,680	19,015	48	65
Netherlands to Indonesia	12,502	16,150	43	56

No single human enterprise during the past century has done more to affect the destinies of nations through a physical

geographical change than the Suez canal. The canal opened up a new shorter route and effected rapid expansion of trade between these two continents, reducing the distance by 7,500 km. The importance of the Cape ports declined considerably after the opening of the Suez.

The usual trade route between the eastern coast of North America and the Far East was through the Cape of Good Hope. The Suez Canal saved a great deal of distance by diverting the traffic from the Cape of Good Hope route to itself and thus benefited North America greatly.

RELATIVE ADVANTAGES OF THE SUEZ CANAL BETWEEN THE EASTERN COAST OF NORTH AMERICA AND THE FAR EAST

	Km	Km	Km
From New York to	Bombay	Batavia	Hongkong
via Cape	16,511	11,986	13,966
via Suez	12,102	10,426	11,676
Distance saved	5,009	1,557	2,293

The canal is of utmost importance to the United Kingdom as it connects her with the Commonwealth countries of the east. From the time of the opening of the Canal, the British ships predominated, though, till 1875, the British had no interest in the Canal itself. In that year the British bought its entire holding of shares from the Khedive. The British however started taking direct part in the administration of the Suez Canal Company only after 1882 when the Khedive wanted the British troops to protect the Canal from destruction by Egyptian rebels. Thereafter, Britain was recognised as the custodian of the Canal, and the guardian of the Isthmus of Suez till 1956 when the canal was nationalised by the Egyptian government. This route was known as the *life line* of the British Empire. Till 1967, for Great Britain, the Suez was the main artery to and from Asia, Australia and East Africa. The canal carried cargo of all kinds for Europe, U.S.A., Asia and Australia. More than 200 million tons of shipping passed through the Suez Canal in 1966 of which 73 p.c. was oil tankers. In 1966, the share of U.K. in the total Canal traffic was 25 p.c. as against 34 p.c. in 1953. Though the British tonnage had remained more or less the same during this

period, the total tonnage of the Canal increased, and thus reduced British percentage.

The Suez Canal provides not only the fastest but also the most economical line of transit between Europe and the East.

Politically the Suez route is vital because of the oilfields in the Middle East countries on whose products the economy of Western Europe is dependent.

The Suez route passes through the heart of the Old World and touches more lands and serves more people than any other route. *"The frequency of ports along this route provides excellent opportunities for trade of the short type."*

The canal can handle about 40 ships a day compared to 17 in 1938. The average time of passage through the canal is from 10 to 12 hours. About 25% of world sea trade, both by weight and value, passed through the Suez Canal till 1967.

The volume of the northbound traffic through the Suez consisted of shipments of petroleum and its products, of which about 86% was oil originating in the Persian Gulf. Minerals and metals accounted for 6% by volume of the northbound traffic, cereals for 3% and crude rubber and textile each for about 1·5%. In terms of value, petroleum and petroleum products accounted for slightly less than 20% ; wool, silk and cotton 20% ; crude rubber 10% ; tea 5%. The northbound traffic through the Canal was thus characterised by the very large volume of bulk petroleum and petroleum products of relatively low value per ton and a few raw materials of very high value per ton. The southbound traffic through the canal was composed mainly of a variety of finished and semi-finished goods of high value per ton moving from industrialized Europe to primary producing countries of Asia. An exception to this was the shipments of cement and fertilizers which account for 13% and 12% respectively of the volume of southbound traffic, but represent very small values.

Problems of the Suez Canal

There are certain problems of the Suez Canal. The canal needs frequent improvements in regard to depth, width, diversion to avoid crossing of ships in the narrow part of the canal

constant dredging operation over long stretches of the channel where sand from the desert is blown into the water, etc. All this means enormous expenditure which must be incurred constantly. In December 1959, the U.A.R. took loan of about $ 57 million from the World Bank at the rate of 6 p.c. interest for a period of 15 years. The loan was taken for the improvement of the canal. Now that the canal is not used after June 1967 on account of the blockade by the U.A.R., the cost of making it usable again will be enormous.

The second problem is now to sustain the interest of the ship-owners in favour of the Suez canal so that ships are not diverted to the Cape of Good Hope route because of high toll rates on the canal. To the U.A.R. government, the canal is an important source of revenue, and the rates of toll payable by ships are often raised. In 1964, the U.A.R. government earned an extra $ 3·45 million dollars by raising the rates. It has been observed that when speed is not essential, many cargo-liners follow the Cape of Good Hope route to avoid the high dues. The closure of the Suez has given a great impetus to all kinds f ships to use the Cape route. To what extent and how soon he normal trade will return after its re-opening is a matter on hich no prediction is possible. Much will depend on the ttitude of shipping companies. Thirdly, the Suez Canal has ot a traffic rival since the opening of the Panama Canal. A horter route is now provided by this canal to the U.S.A. to naintain trade relation with Japan, Hongkong and the Philip-ines. The Panama Canal also shares with the Suez Canal a mall portion of the traffic of Europe bound for New Zealand, Australia and Japan.

The Suez Canal enjoys a special political status on account of the importance of its service. The status was defined at the 1888 International Convention, signed by representatives of Great Britain, Germany, Austria-Hungary, Spain, France, Italy, the Netherlands, Russia and Turkey. According to the International Convention, which is a recognised part of International Law, the Suez Canal is *free and open, in time of war as in time of peace, to every vessel of commerce or of war, without distinction of flag.* The blockade of the Canal since June 1967 is not a violation of the convention in view of the fact that U.A.R. which owns the canal and runs it by an investment trust is

directly involved in conflict with Israel, and that the canal itself is in the area of conflict.

Recent development : The countries that are virtually interested in the Canal are the U.S.A., U.S.S.R., Iran and West European countries. Since the canal is the most convenient route for the Soviet naval detachments to proceed towards the Indian Ocean, the closure of the canal is of political significance to U.S.A. But the closure has encouraged the Soviet to develop its Baltic Sea-Caspian route as well as the Northern Sea route. To Iran, the use of Baltic Sea-Caspian route means a saving of 2,700 miles in distance and 25 days in time in her trade with West Germany and other European countries for oil, machinery and vehicles. If the Suez canal remains closed for a longer time, a large portion of her traffic is bound to be diverted permanently to Baltic-Caspian waterway and Northern Sea route.

Another step taken by many shipping companies is the suspension of services for sea passengers from East to Europe. The rerouting of services via the Cape of Good Hope has increased the duration of each voyage, enhanced maintenance cost and brought about a fall in passenger traffic. The result is the termination of scheduled services by many companies.[10]

The Panama Canal

The completion of the Suez Canal gave a great impetus to the proposal for a canal to connect the Atlantic and the Pacific Oceans across the Central American Isthmus. At first two rival routes were proposed—through Panama Isthmus or through Nicaragua. Panama offered great advantages in respect of length and situation. But the work could not be undertaken before 1907 because of political disturbances in the State of Panama. The region through which the Panama Canal has been constructed is hilly and is composed of hard rocks. The difficulties were removed by cutting the rocks and constructing a series of locks.

[10] These services are of the P and O between India and U.K., the Polish Ocean lines, the Lauro Lines of Italy, the Messegeries Maritime of France and the British Anchor Line.

The Panama Canal, a lock-type navigation canal, was opened on 15th August, 1914. The canal is owned by the Government of the U.S.A. The length of the canal from shore to shore is 40½ miles, and from deep water on the Atlantic side to deep water on the Pacific side, 50 miles. It has a minimum depth of 41 feet. The canal has a summit elevation of 85 feet above the sea. The passage through the canal takes seven to eight hours. The canal can handle 48 ships per day.

Economic advantages of the Panama

The canal has given rise to many new routes and to certain alterations in the old ones. Formerly, the only sea-route between the eastern and the western coasts of the Americas was by Cape Horn. With the emergence of the United States as a world power in 1898, the public in U.S.A. was in favour of an Isthmus Canal to connect the commerce and defences of the two sea-coasts of the country. Without a canal, the country would require two navies because of two oceans. The canal has brought the Pacific coast of America in close touch with the Atlantic coast of the same Continent and with it has stimulated the development of a great volume of intercoastal trade. The canal is a political and strategic link that enables the U.S. Navy to function on either side of the country at will, should the occasion arise.

(*i*) The distance between the Pacific coast of South America and the Atlantic coast of North America has been greatly reduced.

New York to	Valparaiso
via Magellan	8,400
via Panama	4,600

(*ii*) As a result of the opening of the canal the volume of trade between these areas has increased considerably.

(*iii*) Australia and New Zealand are nearer to the U.S.A. by this route.

New York to Wellington		New York to Sydney	
via Panama	8,500	via Panama	9,700
via Magellan	11,300	via Suez	13,400

(*iv*) It has opened up a new route for Europe for going to Australia and New Zealand. There is a little saving in distance in using one route in preference to the other, but steamers usually follow the Suez route.

Liverpool to Sydney		to Wellington	
via Panama	12,400	via Panama ...	12,100
via Suez ...	12,200	via Suez	12,500

From Britain to New Zealand, the Panama route is shorter by about 200 to 600 miles than the Suez route. As it does not touch the shore of any rich country, the Panama route cannot command either cargo or passenger traffic. The steamers therefore follow the Suez route.

(*v*) It has brought the ports of Japan nearer to the Atlantic ports of North America.

New York to	Yokohama
via Panama ...	9,700
via Suez ...	13,100

(*vi*) The Panama has reduced the distance of the sea-route to a considerable extent between the eastern and the western coasts of North America. There is a saving of more than 7,000 miles. Before the opening of the Panama Canal sea-borne trade between these two coasts was almost insignificant.

(*vii*) The western sea-board of the Americas has been brought nearer to Europe by more than 5,000 miles. This has resulted in an enormous increase in the volume of traffic in cargo from the Atlantic side to the Pacific side. More than 10,000 vessels move from the Atlantic to the Pacific via Panama every year as compared to 5,000 from the Pacific to the Atlantic.

Compared to 274 million gross tonnage in the Suez in 1966-67, the Panama had 86 million tonnage.

TRAFFIC ON THE PANAMA CANAL, 1970

	Cargoes	Vessels
Pacific to Atlantic ...	40,595,595	6,664
Atlantic to Pacific ...	73,661,665	6,994
Total ...	114,257,260	13,658

The opening of the Panama Canal has, no doubt, made ny changes in the ocean routes ; but its effect on the trade l commerce of the world has not been so great as was brought ›ut by the opening of the Suez Canal. China and Japan reased their relations with the U.S.A. with surprising rapidity er the opening of the Panama Canal. It may be noted that : Panama Canal is essentially an American Canal. Europe not benefited by this canal in its trade relation with Asia, rica and Australia for which the Suez offers better accessi- ity.

route does not suffer for want of fuel. American coal d oil are cheaper than those found on the Suez line.

Characteristics of the Panama Canal

The canal has six duplicated locks as it has a total rise d fall of 85 feet in crossing the Isthmus. Gatun Locks raise lower ships between the Atlantic ocean and the *Gatun Lake ;* e Gatun Lake has a water surface between 82 and 87 feet ›ove sea-level ; *Gaillard cut* is an extension of the Gatun Lake ; *dro Miquel* Lock raises or lowers ships between the Gatun ake and Miraflores Lake ; the *Miraflores Lake* has 54 feet ater elevation ; the Miraflores Lock raises or lower ships :tween the Miraflores lake and the Pacific Ocean.

The Problem of the Panama

In spite of the tremendous improvements in the Panama anal, its potential capacity to cope with traffic expansion is . During the last decade the cargo tonnage has in- eased by 50 p.c., and this is putting considerable strain on he port operations. Big commercial vessels and oil tankers re too big for the canal. The need for rebuilding the canal) accommodate the biggest vessels is keenly felt. Also, surveys being made to find out locations in Panama for another sible route. Five locations are suitable—one across Isthmus f Tahuantepece in Mexico, another along the frontier between Nicaragua and Costa Rica, two across Panama and a fifth ss Columbia, close to Panama. The main consideration ill no doubt be the political relation of the U.S.A. with the

state through which the canal will be constructed, but the cost factor will also be a consideration.

Some other Important Canals

THE KIEL CANAL. The sea route from the Elbe round Jutland to the Baltic is about 600 miles in length and a voyage through this route is a piece of dangerous navigation. The Kiel Canal connects the Baltic with the North Sea at the mouth of the Elbe and makes the voyage only 61 miles long. It was completed in 1895; it has a depth of 38 feet and 144 feet bottom width. It is capable of allowing passage to large sea-going vessels. The canal was originally built for military purposes to enable the German fleet to move between the Baltic and the North Sea.

The canal is of great commercial and strategic value to Germany. In 1967 about 83,000 vessels of 43 million net tons passed through the canal.

THE MANCHESTER SHIP CANAL. It is the most important canal in the British Isles. It was constructed in 1894 from Eastham on the left bank of the Mersey to Manchester. The canal is 35½ miles long, the minimum depth 28 feet, and the minimum bottom width is 120 feet. Since completion the traffic has grown steadily year by year. The canal passes through Warrington with its metal industries, Widnes and Runcorn with their chemicals and Ellesmere with its oil refinery installations before reaching the Mersey estuary. St. Helens, to the north of the canal, is famous for glass manufactures. Before the construction of the canal Manchester had to depend on Liverpool from where raw cotton used to come by railways. Today steamships can come as far as Manchester. Thus, the canal has permitted the development of many industries along its route and carries today a substantial volume of trade. The canal is in direct communication with all the principal railway systems and barge canals of the United Kingdom. The canal can accommodate ocean-going ships of 12,000 tons.

GREAT LAKES—ST. LAWRENCE SEA WAY CANAL. This waterway, operated jointly by the U.S.A. and Canada, was made open to ocean vessels in 1959 and has made it possible

or the ocean vessels to have a continuous waterway from the Atlantic coast to a distance of 2,300 miles into the heart of North America. In addition to the use of the St. Lawrence and the Great Lakes, a system of canals and locks is provided to overcome an elevation of about 600 feet between Lake Superior and Montreal. Other important ship canals are the Amsterdam Ship Canal, the Stalin Canal, etc. The *Amsterdam Canal* permits Amsterdam to maintain a direct route with the North Sea. The canal was originally constructed in 1876. *The Stalin Canal* has created for Soviet Russia a direct sea-route from the Baltic to the Arctic Ocean. It connects Leningrad with the White Sea.

One of the most serious problems in international navigation in oceans and straights is the exercise of territorial jurisdictions by countries located by the side of such oceans and straights. By convention, the territorial jurisdiction over waters of a country extends between 3 to 12 miles. U.K., U.S.A., Japan, Australia, Netherlands, Belgium and France consider 3 miles as the territorial limits of the ocean waters. U.S.S.R., India, Iran and Canada have extended their territorial seas to 12 miles. The extreme case is that of Chile which has put a claim for 200 miles. It is accepted that no nation should by unilateral action extend its territorial jurisdiction over the seas without regard for the navigation or fishing rights of other nations. Nevertheless, there is no agreed international limits about territorial jurisdiction.

Air-Transport

Aviation is the latest development in transport. The countries which took the lead in developing commercial air routes in the world were France, Belgium, Netherlands, and U.K. These countries after the first world war, put to use their experience of flying and the accumulated planes for commercial aviation, primarily for the purpose of maintaining communication with and defence of their colonies. The U.S.A. entered the field of commercial aviation after 1927. Lack of colonial interest was one of the factors for her delay. The real progress of air transportation, however, started after 1946. The World War II gave a great impetus to the development of

aerial transport and the period between 1946 and 1956 was characterised by quick development of new equipment and by a big upsurge in the volume of air travel. The greatest innovation of the period was the application of Jet propulsion to transport aircraft. Airline distance between two cities is virtually always less than the railroad or highway distance. On an average, airline mileage is 15 p.c. shorter, a distinct advantage to the airlines.

In spite of the fact that aviation is the quickest method of transport, it has not yet become truly global in scope. Firstly it cannot compete with railways and ships for the movement of cheap and bulky goods. Aerial transport is preferred to other modes in moving mails, light consumer goods and passengers because of its speed and relative independence of surface topography. Secondly, air-transport is controlled to a great extent by climatic conditions. Heavy rain or snow-storms suspend flying operations temporarily. Ground fogs also made safe landing of aeroplanes difficult. Though modern development in meteorology and the perfection of devices such as Radio location have made the aeroplane more and more independent of weather conditions, there will still be routes more favourably situated than others and thus more likely to be chosen. Thirdly, the relief of the land over which flying will take place must be taken into consideration. Level lands are indispensable for landing grounds. Commercial flying has therefore, developed greatly in lowland regions like the U.S.A, Germany, Russia, U.K. and Netherlands. The routes are usually decided in relation to ground marks such as rivers or cities for the sake of safety and ease of navigation.

Some Special Features

Within recent years, there has been tremendous progress in aeronautical science resulting in dependable *take offs, flights and landings.* The aeroplane has also become an economic success in most of the countries because of larger traffic—both passenger and cargo. What is generally accepted as the physically shortest route is not necessarily the best to be chosen from the economic point of view. Having regard to speed and cost factors, it is the maximum traffic available on a given route

which often determines the lay-out of an airway system. The amount of fuel an aeroplane would have to carry to make a journey by a route without any stopping places, would mean that there will be less capacity for the aeroplane to convey passengers. Also, there are difficulties in creating new routes.[10] As yet the aeroplanes cannot use the *ocean of air* without agreements with countries over which they are to fly. It is strange to observe that while there are hardly any differences in the international field of surface transport, aviation seems to have inspired an attitude of extreme nationalism from the very outset of its history. There are of course commercial arguments in favour of restrictions inasmuch as free landings may take away the natural advantages of a country in respect of her own commercial lines which have air connections with neighbouring countries. Most Governments allow the aircrafts of other countries to land on their territories only on reciprocal basis. There is no "free air" policy. As for example, the U.S.-Japan aviation agreement concluded in 1952 permits Japanese commercial planes to land in three west coast cities—San Francisco, Los Angeles and Seattle, but not beyond. Similarly, U.S. airlines have right to land in Tokyo for onward journey to South-East Asia.

There are four types of services by air transport: (*a*) International, (*b*) trans-continental, (*c*) domestic and (*d*) feeder. The feeder air route of a country connects a local area with the regional air route and the latter connects the trans-coninental air routes. Heathrow, near London, is today by far the largest centre of international travel in the world. Some 11 million passengers on international flights passed through Heathrow in 1970. An airport for international flights requires more space for aircraft stands and more room for runways as compared to what an airport for domestic services requires. Also, time required for customs, immigration and currency control for international flights is immensely greater than those for domestic services.

[10] The efforts to open up commercial air route across the North Pole for connecting Eurasia with North America have not borne fruit even though such a route would save time and distance. An air route still prefers the existing streams of trade and its focal points to new centres and new routes.

Air-traffic in some countries

The amount of air-traffic in the United States exceeds the total of all other countries. The three chief airlines are the United Airlines, American Airlines and Trans-World Airlines, which are linked with those of Canada and South America. Pan-American Airways is the most important international air carrier in the U.S.A. There are about 7000 civil airports in the U.S.A. The U.S.A. enjoys leadership in the world civil aviation in terms of km. flown, passenger km., cargo ton-km. and mail ton-km. In 1967, it shared more than 50 p.c. in each of them of the world's total. The mail-ton km was 85 p.c. of the world's total.

England was the first country to carry mails, and operate mail and passenger services as early as 1911. Today, there are two corporations in U.K.—the British Overseas Airways Corporation and the British European Airways—for scheduled services. The BOAC was set up in 1939. The Civil Aviation Act, 1946 set up two additional public corporations—the BEA to cover U.K. and Europe, and the British South American Airway to operate to South America and the Carribbean, leaving North Atlantic and Eastern Hemisphere routes to BOAC. In 1949 BSAA was merged into BOAC. There are approximately 100 civil aerodromes in U.K. General responsibility for the development of U.K. civil aviation now rests with the Board of Trade. The main airports used by international scheduled services are London, Renfrery, Birmingham (Elmdon), Prestwick and Manchester (Ringway).

CIVIL AVIATION IN U.K. (in thousands)

(in '000 kilometers)

		1953	1969
Kilometres flown	...	123,251	265,597
Passenger km	...	2,610,797	14,691,345
Cargo ton-km	...	55,692	409,004
Mail ton-km	...	30,835	66,623

In U.S.S.R. civil aviation was started in 1922. Regular air services are maintained throughout the year between Moscow

nd the capitals of all Soviet Republics as well as Peking,)elhi, Kabul, Paris, Warsaw, Prague, Budapest, Bucharest, ofia, Vienna, Berlin and Stockholm. Airways provide the nly means of communications across the desert and mountain- us regions. The arctic regions are served by airlines.

In most of the countries of the world transport as an rganisation receives great attention and control from Govern- nent. This intervention and control are strengthened and nlarged in the case of aviation for reasons of safety. From ntervention, the Government has entered into partnership or as completely nationalised the aviation in many countries. Thus in the international field of aviation, the commercial olicy is in the hands of Governments.

WORLD CIVIL AVIATION

(in million)

	1958	1965	1967	1969
Kilometres flown ...	2,910	4,106	5,290	6,690
Passenger-Km. ...	85,000	198,473	273,000	349,000
Cargo ton-Km. ...	1,660	4,699	6,700	9,950
Mail ton-Km. ...	470	1,101	1,890	2,510

The International Air-Routes of the World

1. *Airways between Europe and America.*

(*a*) Europe and U.S.A.-Canada.

London-Shannon-Gander-Ottawa or New York.

Paris-Lisbon-Azores-Bermudas-New York.

Stockholm-Oslo-Reykjavik-Gander-Ottawa or New York.

(*b*) The route for South America follows the Atlantic Coast of Africa up to Dakar or Natal in Bathurst, and from there it crosses the Atlantic and reaches Brazil. Natal is connected by airways with Rio-de-Janeiro, Buenos Aires, etc. The U.S.A. air lines meet Natal along the Atlantic Coast.

2. *Airways between Europe, Asia and Australia* are mainly maintained by the French, Dutch, Indian and British aero-

planes. The air-routes start from London, Amsterdam or Oslo and end in Tokyo, Colombo, Singapore and Sydney *via* Bahrein, Basta, Karachi, Bombay, Delhi, Calcutta and Rangoon. The Sydney route is served by BOAC in partnership with Qantas Empire Airways of Australia.

The Dutch and French airlines follow more or less the British route. Recently Soviet Russia has opened a new line which connects Moscow with Vladivostok on the Pacific.

3. *Airways between Europe and Africa.* The air services between Europe and Africa are controlled by the Italian, French and British aeroplanes. The BOAC is the most important airway system in Africa and operates in partnership with South African Airways. The terminals are at Johannesburg, Nairobi, Accra, Lagos and Dar es Salaam.

The French have established two air-routes to Africa. One follows the western coast of Africa and goes as far as Equatorial Africa *via* Bathurst. The second route goes across the Sahara and the Congo and ends in Madagascar.

4. *Airways between America and Asia.* Air-transport across the Pacific is at present maintained by U.S.A. aeroplanes. The lines start from San Francisco, Los Angeles and Seattle. The Los Angeles and San Francisco lines meet at Honolulu from where the planes go in three different directions: (*a*) to Tokyo, Manila or Hongkong, (*b*) to New Zealand and (*c*) to Singapore. The Seattle line follows the Canadian coast and goes to Tokyo and Shanghai.

The present problems: The world's airliners are facing an upward cost trend, and unless load factors can be increased significantly, the industry's profitability will decline. Costs and prices are becoming increasingly difficult to offset by greater efficiency. The introduction of high capacity aircraft on some routes has helped the airlines to face the problem because more passengers mean more revenue notwithstanding same fares. However, the squeeze on profits due to rising cost continues. One optimistic factor is the long-term growth of world air transport. It has been estimated that the scheduled passenger traffic will rise three times by 1975 and that freight traffic will increase still faster. "A favourable international economic environment, combined with the substantial increase in traffic,

should provide a good basis for satisfactory industry development in the years ahead.[11]

Another problem is that of the size and equipment of the present-day airports. By 1980, many airports may have to handle 45 million passengers a year each. These airports must be capable of handling more traffic in future. The wide body, high capacity jet known as *Jumbo* has already become a common feature in most countries of the world. The two important problems are the surplus capacity for passenger traffic and the high cost of operation.

QUESTIONS

1. Discuss the relative advantages and disadvantages of land, water and air transport. Name the trans-continental railways of Eurasia and North America. (Cal. B.Com. 1955)

2. The Suez Canal does not just benefit Western Europe. Upon its efficient and 'expeditious working at reasonable cost depend the economics of many Asian countries. Explain. (Patna M.A. 1957)

3. "The opening of the Panama Canal has brought about many changes in ocean routes, but by no possibility can it have such an important effect on the commerce of the world and lead to such a rapid expansion of trade and traffic as was brought about by the opening of the Suez Canal". Discuss this statement. (Delhi B.Com. 1958)

4. Discuss the relative advantages and disadvantages of the Suez and Panama routes from Western Europe to Eastern Asia. Large quantities of jute goods are exported from Calcutta to the Pacific ports of South America. What route do the ships follow for the trade and why ?

5. State the present distribution of the world's merchant marine. How have the relative positions of the countries in regard to merchant marine changed since 1939 ? What are "Tramp" steamers, and what commodities do they carry ?

6. Compare and contrast the conditions of inland water transport in England and Germany.

7. How does the Cape Route compare with the Mediterranean route from India to Europe ? In what way has India's trade with Western Europe been affected now that the latter route is closed down ?

8. Describe the present development of airways in the British Commonwealth. Draw a map of the world and indicate the air routes between Europe and Asia.

9. What are the advantages of air-transport over other means of transport ? Draw a sketch map of the world and indicate the air routes between Europe and Asia. (Delhi U. B.A. Hons. 1950)

10. Discuss the effects of development of air routes upon the economic life of a country. Give illustrations. (Cal. Inter. 1955)

11. Give an account of the geographical, political and economic significance of the Suez Canal and compare the role of the Suez with that of the Panama Canal.

[11] Extract from the speech of Mr. Knut Hammarskjold, Director-General of the International Air Transport Association at the annual meeting at Manila in 1967.

12. Describe the importance of the North Atlantic Ocean as a main headway of commerce. (Cal. Inter. 1967)

13. "The inland waterways of North Western Europe comprise the most highly developed and completely utilised system of rivers and canals in the world." Discuss the statement. (Bihar M.A. 1967)

14. Give a brief account of the development of air transport in the modern world. (Delhi B.Com. 1965)

15. Discuss Suez and Panama canals as carriers and distributors. (Delhi B.Com. 1964)

16. What were the economic consequences of the closure of the Suez Canal after the U.A.R.-Israel conflict in 1967 so far as the traffic between Far East and West European countries were concerned ?

17. Discuss in detail the role of inland waterways of Europe in the economic progress of the continent. (Delhi B.Com. 1968)

18. Give an account of the inland waterways of Europe and discuss their role in the economic development of the continent. (Delhi B.Com. 1971)

19. Discuss the relative advantages and disadvantages of water transport. Name the principal ocean routes of the world. (I. I. Bankers 1971)

CHAPTER VIII

DEVELOPMENT OF PORTS AND HARBOURS

A port is essentially a gateway to the land from the sea, nd also, nonetheless truly, a gateway to the sea from the land. t is a place on the water route where ships can find accommo- ation during the process of loading and unloading.

The dual operation of loading and unloading cargo involves wo important characteristics in a port, without which its func- ions cannot be satisfactorily performed. These characteristics re shelter and accommodation.

It is not easy for a ship to load or unload goods in an ex- osed and unprotected situation on the sea-coast. In West frica, where the coastal sea is very shallow, ships are compelled o lie at some distance off the shore. If the sea is violent all the ear round, it is equally difficult to perform shipping operations.

Harbour, an essential factor in a Port

In order to perform loading and unloading with ease and afety, ships require shelters on the coast. It is an important equirement. The idea of shelter is closely associated with the erm harbour. A harbour is a place of shelter for ships. There are two kinds of harbour—(*a*) natural and (*b*) artificial. A *natural harbour is generally an indentation in the coast-line, sufficiently enclosed or protected by its environmental and topographical features to provide a tranquil water area for shipping.* Natural harbours are formed by a bay, estuary or river which can be used without extensive works of improvement. Although all harbours need improvement in view of the changing designs in vessels, the world's leading harbours are still natural. San Francisco, Liverpool and Cork possess excellent natural harbours.

Artificial harbours are constructed by a system of breakwaters or by dredging inland, to form an artificial bay or lagoon. The object of a breakwater is to provide barrier designed to break up and disperse waves for preventing agitation of the

water surface within the harbour area so that ships can lie in safety.[1] Where the water is shallow, dredges keep the outlet deep. Los Angeles and Madras have artificial harbours.

An ideal harbour should be (*i*) well-protected against storms, (*ii*) free from ice during winter, (*iii*) deep enough for vessels, with fairly deep water near the shore, (*iv*) wide enough to give room for large ships to turn in, (*v*) sufficiently spacious for docks and wharves, and (*vi*) accessible to the interior by straight and level routes.

Port Accommodation

So, an important requisite of a port is adequate space for breathing and port operations.[2] A harbour by itself does not suffice for all the requirements of a port, which must include convenient and continuous accessibility and facilities for the landing and loading of goods, the embarkation and disembarkation of passengers, quays, sheds, warehouses, cranes, service roads and railway tracks.

Importance of a Port

Ports grow and prosper because they are important gateways of trade. Trade is attracted when a port enjoys economic advantages like (*a*) a large productive and consuming hinterland, (*b*) easy access to the hinterland and (*c*) location on or near main world trade routes. *The fundamental importance of a port, however, consists in the extent and productiveness of its hinterland.* Hinterland means a region to which a port acts as a 'door'. The trading operations of the port of Calcutta are performed for West Bengal and Bihar; and, therefore, the

[1] A breakwater must be strong enough to withstand the impact of maximum waves and should avoid wave deflection. A simple stone-mound type of breakwater can be effective where the water is relatively shallow. In deep water, a firm sea-bed foundation and solid concrete blocks are essential.

[2] Berthing space is for the reception of vessels and for their repairs and maintenance. The term *dock* is used in this sense. Docks are of two kinds: *dry docks* for the building, repair and maintenance of ships out of water, and *wet docks* for receiving ships that are kept afloat. The structures that form a wet dock are called wharves and are of two general types. Structures built along the bank parallel to shore are called quay walls, and those that project into the water are known as piers.

hinterland of Calcutta includes these States. The resources of a hinterland should be bountiful, if the port is to develop greatly. A dense population, rich economic products and a good transport system make a hinterland productive. In short, a hinterland should possess inducements for trade. The extent of the hinterland of a port depends on the nature of the means of communication. Communications bring the different parts of the hinterland in close touch with the port. A port is a connecting link between land and water traffic, and, therefore, it must be connected with the surrounding areas by roads, railways, rivers and canals. Hinterlands are generally of two types—distributory and contributory. *A distributory hinterland* is one where import trade is of greater significance either to feed the dense population, or to supply the inhabitants with raw materials for industries or consumers' goods. Goods are also imported as raw materials for manufacturing industries. The hinterland is *contributory* when the region is productive enough to contribute to the world markets some of its products. These goods may be food or raw materials or manufactured articles. The trade of a port reflects the conditions of production, consumption and transport facilities of its hinterland.

There may be several ports in the same hinterland. Traffic will flow to those ports which will offer greater trading facilities. Kandla, Bombay, Okha, Porbandar and Navalakhi on the western coast of India serve more or less the same hinterland, but the predominance of Kandla and Bombay is due to their having better port facilities.

Kinds of Ports

Sea ports, river ports, canal ports and estuary ports are so named because of their location. These ports have different functions to perform ; each of them owes a large share of its industrial development to the ease of obtaining raw materials and the existence of assured markets.

SEA PORTS may be divided into four classes according to the character of the harbours and their relation to the routes on the lands:

(1) **Open roadsteads, *e.g., Boulogne.*** These are usually poor, because they do not afford good and safe harbours with

sufficient depth, or protection from winds and waves. They are rarely located near the mouth of large valleys, and therefore transportation towards the interior is hampered.

(2) Bay ports, *e.g.*, Boston. Harbours at such places may be safe, commodious and deeper, and there may be plenty of room for docks.

(3) River ports like Calcutta have the advantage of easy communication in land, but they often suffer from lack of depth and space for anchorage, docks and wharves. Room can only be found by extensive digging or by going far up or down the river.

(4) Ports with both a bay and a river are commercially most advantageous. They usually combine safe and commodious anchorage with sufficient room for docks and wharves, and with easy access to the interior.

Bulk cargoes and superports

Sea ports differ from one another in scale and function. All port planning, however, has to take account of new techniques and changes in the nature of cargoes, the size of ships, speedy turn around and the method of transferring cargoes between ships and shore. Bulk cargoes of new and unforeseen kinds have developed. Most problems arise from general cargo, consisting of thousands of relatively small packages and consignments and causing congestion and labour troubles.

The use of big ships for bulk cargoes has increased very much in recent years. A big ship permits a cheaper freight cost per ton of cargo. It is interesting to note that the lead in the use of large ships was taken first by oil companies. After the second world war, a *super-tanker* was of the tonnage of between 32,000 to 50,000 tons. In 1964, a *giant tanker* was of the tonnage of 150,000. Today, a *mammoth tanker* is of 312,000 tons.

On the basis of a 10,000-mile voyage, it has been estimated that while the freight cost per ton for a 10,000 tonner is 33s. 10d, it is 6s. 6d for a 300,000 tonner.

The increase in the size of vessels for handling bulk cargoes has naturally brought the question of converting many existing ports into superports. Also, a new role for the rail

ways in bringing from and sending to long-distance inland the cargoes in time is being assumed.

Entrepots and Free Ports

There is another kind of sea ports known as entrepots. *These ports import commodities for the purpose of re-export to* other ports. In short, these ports act as middlemen and their main function is redistribution. They collect goods not for the local areas but for certain regions which cannot import directly from the sources. Singapore, a port at the end of the Malaya Peninsula, receives the products of the adjoining islands for exporting them to the different parts of South-East Asia and other countries.

Distance between the place of origin and destination of goods also influences the entrepot trade. The hold on the trade of the entrepots is great when the origin and destinations of the traffic are remote. Spices, drugs, silks, and other tropical products are consumed in small quantities by the European countries. It is a great economy when these commodities are distributed from some western entrepot. Hamburg, on the Elbe, is the entrepot for Norway, Sweden and the Baltic States. An excellent example of an entrepot is afforded by Port Said, where all the routes from the West meet before passing the Suez. The great entrepots of the world are London, Colombo, Singapore, Hamburg and Hong Kong.

An entrepot is different from a *free port* to which goods may be admitted without customs or embargo pending reshipment to other ports or pending later entry to its hinterland. A free port encourages export trade because vessels from different countries can land goods without import duty for transhipment later on. There are many free ports in the world of which two are in the U.S.A.—New York Foreign Trade Zone I and New Orleans. India has no free port. All free ports are entrepots also.

Standards of comparison. The standards by which the importance and prosperity of ports can be measured are various, and hence are not simple and easy. The following are usually employed:

1. The number of ships visiting a port during a year.

2. The tonnage of shipping.
3. The tonnage of goods discharged or handled in and out.
4. The marketable value of the produce dealt with.

The importance of a port cannot be measured simply by the number of ships visiting it every year, because the ships may be very small or big in size. The size and importance of the vessels can be ascertained to a certain extent from the tonnage of shipping. In addition to this, the tonnage of goods handled by a port can also be a very good standard of comparison. But it has one great drawback: it makes no distinction in the nature of goods, whether valuable or merely bulky and cheap.

Some Important Ports

EUROPE. The important sea-ports of Europe are situated on the north-west coast. The chief of these are Hamburg at the mouth of the Elbe; Rotterdam on the Rhine; Antwerp on the Scheldt and Harve on the Seine. The hinterlands of these ports are very extensive and productive.

The hinterlands of the Mediterranean ports have become important after the opening of the Suez Canal, which has made the Mediterranean Sea one of the most important highways of commerce. The chief sea-ports are Marseilles, Genoa, Naples and Trieste. The Baltic and the Black Seas are almost land-locked and, therefore, have not many important ports, although some of them occupy very favourable positions.

London, the largest port in the world, is situated at the head of the Thames estuary, 55 miles from the sea. Dredging operations are not generally necessary, as the tide rises from 16 to 21 feet at London Bridge. London is an entrepot and has for a long time played the role of a big international warehouse. It imports products from all over the world, which immediately re-exports. From an entrepot, it has become greatest money centre in the world.

Trade and industrial activities of London are also great. It receives between 30 and 40 p.c. of British imports and catches more than 25 p.c. of the country's exports.

Glasgow is the largest ship-building centre in the world. The port is situated on the Clyde, 20 miles east of Greenock. The Clyde banks from Greenock to Glasgow are noted as ship-building regions with many docks. The sheltered position of the Clyde, the supplies of iron ore and coal in the neighbourhood, the depth of the river have made the Clyde estuary an ideal ship-building area.

Although Glasgow is an engineering centre, it has developed other industries as well. Woollen goods, the manufacture of carpets, dye works, glass works, chemical works, oil refineries, paper mills, soap works, the making of confectionery, etc., are there not only to meet the needs of its great population but also for markets abroad.

Liverpool is situated at the mouth of the Mersey estuary.[1] The main problem of the port is to maintain adequate depth by continuous dredging. It competes with London for the mier position. In export trade it occupies the first place in United Kingdom and in import, it is second to London. is the leading port for the importation of raw cotton, grain d provisions. Woollen and steel goods, pottery, chemicals, dware, etc., are exported. The hinterland of Liverpool not ly covers South Lancashire, but also Yorkshire, Staffordshire d Cheshire.

The port of Liverpool handles more than one-third of the ssenger traffic of Great Britain. Flour-milling, sugar-refining, emicals, soap-making, etc., are the principal industries. verpool is also an airport.

Cardiff is the leading port of the shipment of coal, not ly in Great Britain but also in the world. It is located on th banks of the river Taff, a mile above its junction with Bristol channel, and extending to the river Rhymne on e east and Ely on the west. There are important iron and el works in the port area. The prosperity of Cardiff has been reatened recently by the falling off in the demand for coal abroad, due to various reasons. Oil is now largely used ship and locomotive engines. Moreover, several countries ve developed hydro-electric power. These factors have adversely the coal-export trade of Cardiff.

[1] Liverpool is the first port in the world to use radar on a full scale is to assist ships in piloting in and out of port.

Manchester is situated on the river Irwell, a tributary of the Mersey. It is connected by a ship canal with Liverpool. It is the fifth port in Great Britain. Its central position has made it one of the principal manufacturing cities of the world, and the greatest cotton centre in U.K. About 90 per cent of Lancashire's spindles are confined within 17 miles of Manchester, but not much in the city itself. Although cotton industry is still the chief local industry, there are other equally important industries like heavy engineering and chemicals.

Hamburg, the most important port of West Germany and one of the principal ports of the Continent, is situated on the Elbe at a distance of nearly seventy miles from the open sea. The estuary of the Elbe has been dredged to a sufficient depth. As the port is connected with the plains of Germany by waterways and railroads, the commerce of the country converges towards it. Hamburg is a great entrepot or warehouse port.

The construction of the Ems-Weser and Hansa canals has made it possible for Hamburg to have direct water communi tion with the industrial Ruhr Valley. Much of the tra which used to pass through Rotterdam and Antwerp previously is now handled by Hamburg. Cruxhaven is the outport of Hamburg.

Rotterdam, in the Netherlands, is the second largest cit in the country, the largest port in Europe in respect of tonnag and one of the finest harbours in the world. Rotterdam's posi tion at the mouth of the Rhine, at the natural terminal f Swiss and German barge traffic from the great heavy industria heart-land of Europe, and close to deep water, gives it ev natural advantage. *Europoorts,* the direct expression Rotterdam's intention of becoming the major port of the mon Market, was started only in 1960. Today, the long li of oil refineries and chemical plants stretch for miles al the Mass estuary. Europoort has unloaded tankers 131,000 tons, and facilities are being developed to date 500,000 tonners.

A channel is being dredged 75 ft deep for 15 miles into the North Sea. The reason for building all these lities for tanker traffic is the present location of oil refin around Rotterdam. The only disadvantage of the channel

the fact that there are subterranean mountain ranges which may ground large ships.

Antwerp, in Belgium, is situated at the mouth of the river Scheldt. It is one of the greatest ports in the world. It has a large entrepot trade. Its hinterland includes Belgium, Eastern France, the Rhine Valley and the Ruhr coalfield. The traffic of Antwerp mainly deals with liners and general cargo. The port competes with Rotterdam and Hamburg. Antwerp ranks first amongst the seaports of the European continent.

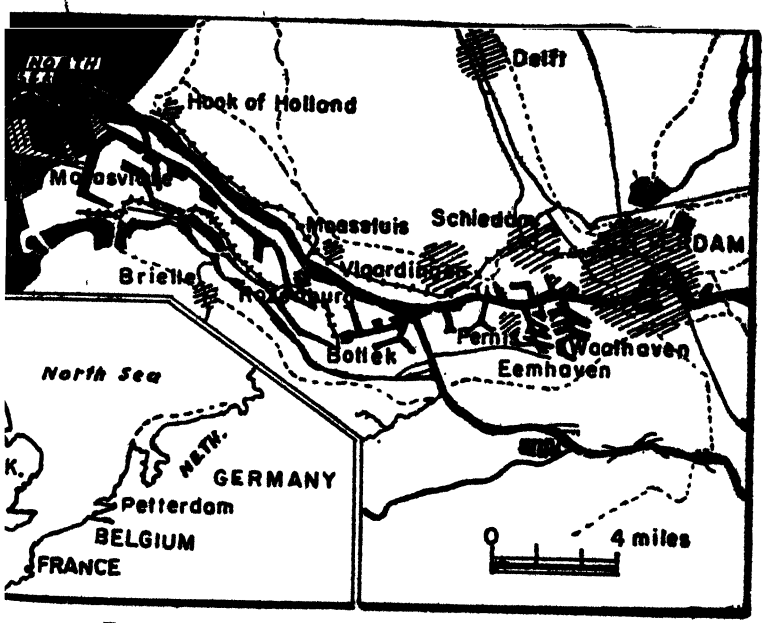


FIG. NO. 50. The Traffic Flow of Rotterdam.

Marseilles is the first port and second city of France. It situated some 30 miles east of the Rhone mouth. Its position at the head of the Gulf of Lyons and at the entrance of the Rhone Corridor has made it very important. Marseilles is fast becoming a great industrial centre. Its traditional industries are the manufacture of olive oil and soap, oil refining and ship building. The new industries are the processing of plastics, the manufacture of ceramics and cement, and industries based on electro-metallurgical processes. By a deep-water canal

the port has recently been connected with the Rhone. It has not only made the trade with the East very convenient, but has also got direct access to North Africa. Wheat, oil-seeds, sugar, coffee, hides, silk, spices and other Eastern products are imported.

NORTH AMERICA. The important ports of North America are Montreal, New York, Boston, Halifax, New Orleans, Mobile and Galveston on the Atlantic and San Francisco, Oakland, Seattle, Vancouver and Portland on the Pacific. The hinterlands of the Atlantic ports are very extensive and rich in economic resources compared to those on the Pacific ports.

Baltimore, on Chesapeake Bay, is a great port and distributing centre of importance. Being located further west than other ports of the Atlantic coast of U.S.A., it enjoys lower freight rates. Moreover, it has two outlets to the sea: natural waterway to the Virginia capes and the upper Chesapeake Bay. It is connected with the Middle Appalachian Region by cheap water transport. It is the biggest city in South-east U.S.A., and contains more than 950,000 people.

Boston is a major Atlantic seaport of the U.S.A., well located for shipping as it is 200 miles nearer to Europe than is New York and 1200 miles nearer to the West coast of South America than is San Francisco. Its harbour is about 50 square miles in area and is one of the finest natural harbours of the world. Boston is also one of the leading commercial and industrial centres of the U.S.A.

Though Boston is next to New York in importance its main wealth today is derived from manufactures rather than commerce.

Montreal, situated at the confluence of the Ottawa and St. Lawrence, lies at the limit of ocean navigation and is largest inland seaport in the world. It is 300 miles nearer Liverpool than New York. Its harbour, in extent and equipment, is one of the finest in the world, but its great drawback is that navigation is closed by ice during the winter months. Montreal is the largest city of Canada and contains more than 1·3 million people. The principal industries are the manufacture of railway rolling stock, aircraft, electrical supplies clothing industry. It is "the hub of Eastern Canada's inla

vaterways system; the headquarters of Canada's two largest railway systems and an air crossroad of the world."

New Orleans, situated at the mouth of the Mississippi at a distance of 10 miles from the Gulf of Mexico, is the third largest city in the U.S.A. and the country's second foreign trade zone. Its port facilities in deep-water terminals, canals and water port extend to an area of 20 miles. The products from foreign countries can be stored indefinitely, and duties are paid only when goods enter domestic markets. Its hinterland includes the rich Mississippi-Missouri basin. It is also an industrial centre of great importance with ship-building, textiles, tobacco manufactures, sugar refining, and industrial alcohol. It is the greatest fur-producing area in North America. *New Orleans is not so well situated as Boston or New York for trade with Europe.*

New York is the most populous city, the nation's financial and business centre and a chief port of the U.S.A. It has a deep and spacious harbour close to the open sea. Also, the Hudson river and a water-level route to the Great Lakes have made the hinterland more wide. Nearly one-half of the total foreign trade of U.S.A. passes through it.

The important Pacific ports of North America are San Francisco, Los Angeles, Seattle, Portland and Vancouver. These ports have large harbours with good shipping facilities. But these have certain drawbacks: (*a*) their hinterlands are small and sparsely populated; (*b*) the Pacific coastal region is industrially less developed; (*c*) long distances and difficult routes separate these ports from the continental interior.

San Francisco is the most important port on the Pacific coast with a land-locked harbour—one of the finest in the world. It is surrounded on three sides by water with excellent transportation facilities, making it a major port, from where steamships operate for the different parts of the world. Its importance lies in being a production and buying centre, a distribution centre and a supply base.

SOUTH AMERICA. Although the size of South America is twice that of Europe, its ports are few. The Atlantic ports command greater traffic because of the great extent of their hinterland. The *Andes* are set close to the Pacific coast, and there the Pacific ports have limited resources. The principal

ports of South America are Rio-de-Janeiro, Buenos Aires, Valparaiso, Montevideo, Bahia, Guayaquil and Bahia Blanca.

Rio-de-Janeiro, the capital of Brazil is a major port which receives the largest volume of imports and ranks second in the country after Santos in exports. The harbour is within the shelter of the bay and can allow large ocean-going vessels to enter. The port is also connected by rail with other parts of South America and by airways with other parts of the world.

Buenos Aires is the capital and principal port of Argentina and stands on the right bank of the Rio de la Plata on a low coast and flat area. For its size and traffic, Buenos Aires is the most important city in South America and second in the western hemisphere. The harbour is 150 miles from the Atlantic ocean. It is the leading industrial centre with industries like textiles, tanneries, meat packing. It is also the terminus of the Argentine railway.

Valparaiso is the most important port on the Pacific coast of South America. It is situated on a fine bay and its position is similar to that of San Francisco. Its hinterland includes the rich mineral districts of Chile. Nitrate of soda, copper, silver and gold are exported. The port is connected with Buenos Aires by railways. A new port has been developed at St. Antonio, 43 miles to the south of Valparaiso.

Montevideo on the north shore of the Rio de la Plata in Uruguay is one of the leading ports of South America. It handles 90 p.c. of Uruguay's foreign trade, and exports wool and meat. It possesses a large harbour, but the water of th shore is very shallow because of the accumulations of silt. Large ships have to anchor two or three miles away from the shore, from where goods are carried to the port by lighters

Guayaquil is the chief port of Ecuador. It has an excellen harbour at the estuary of the river. The main draw-back is the unhealthy climate of the port. Ivory-nuts and coffee exported.

ASIA. Compared to the gigantic size of Asia, the numl of ports are not many. The important ports are in Ja Malaysia, India, Pakistan and Burma. *Karachi* is the chief por of Pakistan, situated near the mouth of the Indus. Karachi not yet an industrial centre ; it is of importance as the princi market and port of shipment for the surplus produce

Pakistan. Wheat, cotton, barley, rice, gram, oil-seeds, wool, hides and skins and animal bones are the principal exports. The imports include woollen piece-goods, machinery, iron and steel, mineral oils, coal and coke.

Bombay owes its importance to its excellent geographical location and to its magnificent natural harbour. It is situated on an island in Maharashtra State. Its harbour is one of the largest in the world, permitting ships of all sizes to have accommodation for receiving or releasing traffic throughout the year. "The entrance to the harbour is from the South-West ; and the Colabo peninsula, the narrow strip of land which constitutes the southern extremity of Bombay Island, forms a natural breakwater affording protection from the violence of the monsoon." The hinterland includes the whole of the Deccan and the central part of India and extends to Punjab.

Cochin in Kerala is the most important port between Bombay and Colombo. The system of backwaters runs parallel with the coast and affords cheap transport and excellent waterways by connecting several places of importance of Kerala. The port has been very much developed recently and there has been a very great increase in its trade.

Madras has the third largest harbour in India. Till the construction of an artificial harbour in 1875, Madras was an open roadstead with a surf-beaten coast-line. The harbour is connected with the different parts of the Deccan and Northern India by railways. The important industries are textiles, tanneries and chemicals.

Calcutta, situated on the river Hooghly, is a great sea-port, although it is 180 km. by water from the sea. Its hinterland includes West Bengal, Bihar, U.P., Assam and Orissa, and also extends to Punjab and the northern part of the Deccan. The port serves the great coal, tea, jute and steel industries of West Bengal and Assam and the wheat, rice and sugar traffic of Bihar, U.P. and M.P. It imports cotton piece-goods, metals and ores, oil, machinery, hardware, paper, motor vehicles, liquors, etc. The exports are jute, tea, pulses, hides, lac, pig iron, mica, manganese etc. The port facilities are excellent.

Akyab is the only sea-port on the western coast of Burma. It has a sheltered bay, but as a port it is not very important.

Its hinterland is neither extensive nor very productive. Beside the port has no railway communications with the interior.

Rangoon is the chief port of Burma. It is situated on th Rangoon river, about 24 miles from the sea. Timber is the mo important commodity exported from here. Rice and petroleu are also exported.

Singapore is about 27 miles long and 14 miles wide, and separated from Sumatra by the Strait of Malacca. It is one the world's great port and a cross-road of sea-routes and airwa going in all directions. Its economy is based on the princip of free trade. About 30 p.c. of the Republic's G.N.P. is derive from entrepot trade. Malaysia and Indonesia remain Singapore biggest trading partners. It exports rubber, tin, copper, pin apples, etc. Imports include petroleum, tobacco, sugar, iron an steel, machinery, etc.

Hongkong is situated at the mouth of the Canton riv and consists of an island. Protected by hills to the north an south and entered by a deep cut in the eastern approache the harbour stretches in a funnel in the west measuring som seven miles long by three-fourths of a mile at its narrowes The Canton river, which is navigable for more than 600 mile brings down the produce of China in river steamcraft to Hon kong for transhipment. It is important as an entrepot por The harbour of Hongkong is extensive and spacious ; its onl drawback is that it is exposed to the influx of heavy seas fro the west during the prevalence of typhoons.

Yokohoma is the principal sea port of Japan, located in Island of Honshiu in Tokyo Bay, 18 miles south-west of Tok It is also the centre of Japan's silk exporting industry.

Cities and Trade Centres[4]

A trade centre is a concentration of commercial activitie in a place, favoured by a net-work of communication for th movement of goods. Men live in villages, towns and cities. I all these places, men carry on their economic activities lik

[4] See Geddes Patrick: Cities in Evolution, William and No London, 1949 and
Savage, Sir William: The Making of our Towns, Eyre and Woode, London, 1952.

production, buying and selling primarily for their respective areas. Each place can become a trading centre when people are engaged in such commercial operations and have trade contacts with other regions or areas. A self-sufficient place without any trade contacts is not a trade centre. Trade requires that a city must have adequate communications, and commercial activities.

In early days, when the volume of commerce was very much smaller than it is today, the interchange of commodities used to take place between individuals at the common meeting place. The growth of trade centres originated from the necessity of such a common meeting place.

Trade centres do not grow all at once nor are they just congregations of people in a place in which conditions of life can be described as urban in contrast to rural life of the open country. Their origin and growth are the direct consequences the division of labour, the outcome of the operations of ographical control and the result of man's environment. It ten takes many years before an urban place becomes a trade ntre. Several forces—human and physical—are at work in this transformation. The fundamental condition is the pre- ence of trade in which people of different regions and coun- ries are interested. It is not possible to draw an accurate line demarcation between a city and a trade centre, since a city oes through many changes in activities before it becomes a ade centre. Yet, there is no city which has not some trade. The difference lies in degrees and in the character of the trade— hether it has trade contacts with outside areas. With more nd more activities, trade relations with other regions are deve- loped. This evolutionary character of a city amply demonstrates hat "a city is not only a place in space; it is also a drama in ime".

Towns and cities create conditions for the trade centres to levelop around them. It is, therefore, necessary to know how ns and cities grow.

Conditions favouring the growth of cities

1. Religion and religious foundations had great town- reating powers. Because of sanctity attached to certain places ut of religious beliefs, people holding such faiths visit them

occasionally. These places are either in the habitable plains or on mountains or deserts. If the holy places are otherwise conveniently located from the point of view of communication, they will inevitably attract many to settle there as traders. In fact, almost all the holy places enjoy brisk trade in many articles which pilgrims buy as mementoes. Rome, Varanasi, Mathura, Hardwar have become important trading centres because of easy communications. Places like Amarnath (Punjab) and Badrinath on the other hand (U.P.) have not become cities because of unfavourable locations and lack of communications.

2. Many places are known as health, tourist and pleasure resorts where people go to get relief from the smoky manufacturing centres or congested areas. Some of these places have slowly become cities with hotel industry as the main activity. The hill stations in Northern India which were developed by the British Government primarily for the families of the British troops and officers, or as summer capitals, have lost their original character. Many of them are now important trade centres as, for instance, Simla, Mussourie, Nainital and Darjeeling. Another vacation resort is the sea-coast. The sea-coast is cool and pleasant, particularly during summer, and thousands of people go there for a change. Towns thus spring up in such places to provide accommodation and other amenities.

3. Existence of minerals in many cases is a vital factor in the determination of the location of industries. Once an industry is localised, the place soon starts pulling people towards it either for employment or for other opportunities. One may refer to the growth of many towns in the vicinity of mineral deposits.[6]

4. Towns tend to grow at the confluence of two regions producing different commodities, because they give the population of both places a meeting ground for the mutual exchange of their goods. Milan, situated at the foot of the Alps, is a good example in point: here products of the plain and of the mountains are exchanged.

5. Water-power and its conversion into electricity have caused and aided the growth of industrial towns like Richmond, St. Paul, Buffalo and Minneapolis in the U.S.A.

[6] Even when climate and other conditions are remarkably hostile, mineral deposits can attract settlers as in the case of Western Australia.

6. Towns grow at places which are most convenient for the receipt of goods in bulk and for their distribution. The world's great cities are generally ports and railway centres.

7. Government is the most important non-economic factor in the growth of trade centres. In recent times, the growing tendency on the part of the government to centralise its activities in capitals has much to do with the increasing population in New York, London, Washington, Moscow, Delhi and Tokyo. These have also become trade centres now.

8. The development of land transport has led in modern times to the growth of cities like New York, London, Paris. Land transport permits people from neighbouring and other areas to settle or develop trade.

9. Trade creating forces have not spared even educational centres. In many countries, educational centres were deliberately opened in quiet surroundings—often many miles away from cities to avoid distraction. In course of time, however, these centres also became cities and trade centres. The most significant example is the history of Oxford which is today an important automobile manufacturing centre.

10. Towns tend to grow at the crossing of important trade routes by land or water. Two important crossings of the Suez route are Colombo and Singapore, both of which are trade centres.

In early times, men's desire to have a place of safety and mutual protection led to the selection of sites which were easily defensible. Thus, Athens and Rome were built from such considerations. Walled cities in India were the safest places in the past. Even today, forts, garrisons and naval bases are established in locations, considered strategically important. The main disadvantage of such cities is that scope for trade and population is not generally great, and consequently few such cities become trade centres.

All cities, however, require that there must be the supply of water for drinking purposes, the usual source of which is a river, or a stream or sub-coil for wells. Practically all towns in India are located near the rivers. Low-lying grounds near the rivers are generally avoided for trade centres when such sites are liable to floods.

The distribution of trade centres over the world is very

irregular. There are a little over 600 trade centres (each wit over 100,000 population), most of which are located in Nortl east U.S.A., North-western Europe and the Pacific coast of Asi This uneven distribution is caused by (*a*) unequal distributio of world resources, (*b*) diverse climate, (*c*) different types of top graphy and (*d*) attitude of men.

QUESTIONS

1. State the necessary conditions for the development of good sea ports. Apply these considerations to any of the following:—(*a*) Montreal, (*b*) Freemantle, (*c*) Shanghai, (*d*) Buenos Aires, (*e*) Trieste, (*f*) Rotterdam (*g*) Genoa.

2. What factors make for the successful development of a river port ? Give a few conspicuous examples.

3. What do you understand by the hinterland of a port ? Illustrate your answer with reference to a few ports in different parts of the world. (Cal. Inter. 1957)

4. State the situation and mention the geographical circumstances giving importance to any five of the following: (*a*) Glasgow, (*b*) Winnipeg, (*c*) Danzig, (*d*) Mosul, (*e*) Singapore, (*f*) Hongkong, (*g*) Durban, (*h*) Los Angeles, (*i*) Brisbane.

5. What are the most important geographical conditions favouring the growth of commercial and industrial towns ? (I.I.B. 1967)

6. "The importance of a port depends mainly upon the extent and the productiveness of its hinterland." Discuss the statement.

7. What are the important factors in the origin and development of sea-port ? Illustrate your answer with reference to Indian ports.

8. "The character of a harbour has a great influence on the growth of a sea-port, but an ideal harbour does not necessarily give rise to a great port." Discuss.

9. Attempt a functional classification of ports, giving suitable examples. (M.A., Patna, University, 1956)

10. Locate and discuss the geographical and economic factors that have led to the development and importance of any five of the following: Delhi, Vladivostok, Winnipeg, Peshawar, Liverpool, Colombo, Marseilles. (Indian Institute of Bankers, 1960).

11. It is said, "An ideal harbour does not necessarily make a great port". Explain the statement. (Indian Institute of Bankers, 1967 ; 1969)

CHAPTER IX

WORLD COMMERCE[1]

Production of food and raw materials and the manufactures are carried on solely for the purpose of trade within and outside a country. As a rule, trade between countries—known as world or international commerce—is more complicated and more difficult than trade within a country, known as domestic or internal commerce. Apart from the difficulties in respect of distance, languages, currencies and weights and measures, the most critical factors are (*i*) the presence of competition, (*ii*) the government policies and (*iii*) the nature and character of demand for products.

Few countries enjoy virtual monopoly or extraordinary advantages in the trade of goods so as to be absolutely free from any kind of competition in the world markets. There are, no doubt, examples of some rare minerals which are supplied only by a few countries, but, even then, the products which depend on such minerals find markets competitive. Government policies relate to relaxation or restrictions of control, duties and procedures about goods to be exported. Not only are the policies different with different countries, they also change more frequently these days. Furthermore, it is difficult to predict how long the nature of demand for a particular commodity will remain the same. Much depends on the culture and the living standards of people in a country.

All these factors have created many risks for trading countries.

The basis for international trade are derived from physical and economic factors. Natural resources—minerals, agricultural products, animal and fish products can only be developed in areas where these are available provided the conditions of climate and land do not take away these special facilities. Pro-

[1] Data and figures are from Statistical Year Book, (1970), Twentieth issue, statistical office of the United Nations, New York, 1971; Statesman Year Book 1971-72: The Far East and Australasia 1969, Europa Publication, London 1969.

ductive processes of extractive industries must have to be conducted near the natural resources. Industries which are concerned with the working up of raw materials into finished goods can be developed away from the areas where the natural resources are available. Whatever may be the reasons—racial, climatic or cultural, the capabilities of men differ from region to region. Trade demands for its success, men with technological and scientific ability as well as an environment in which men can have aspirations and scope for achievement. Often, the past achievements of a nation in trade acts as a momentum for the next generation.

The gains from international trade arises when the ratios of costs of production is different between the countries. So long this difference is maintained, there will be demand for goods by one country from another. However this advantage is not a permanent one in view of the fact that customer countries may with the help of latest scientific and technological methods produce similar goods or their substitutes at cheaper rates. Gain from international trade is also derived from the size of the market in the world in respect of demand for the goods.

The size of a market is a factor of international trade which determines the extent of gains. Bigger the size, greater is the gain. Since the movement will depend on the facilities of transport as well on their costs, the gains are influenced by the nature of such facilities and costs.

The extent of gain also depends on the *terms of trade*, that is, the ratio at which a commodity is exchanged for another commodity. The term of trade itself will depend on the play of reciprocal demand—on the elasticity of a country's demand for a particular commodity of another country as well as on the demand of the other country for the commodity to be exchanged.

Some Facts About World Commerce

Economically, it is advantageous for a country to produ those goods or services for which it has relatively better adva tages than other countries and to exchange such products services for those in which others are relatively more

There will always be exchange of goods between climatic zones—tropical areas sending out jute, natural rubber, coffee and tea, and receiving wheat, meat and timber of certain types from the temperate areas. All countries, however, within a zone may not have the same degree of development, and consequently there cannot be an identical pattern of foreign trade in the same zone. Geographical facts can hardly give all explanations

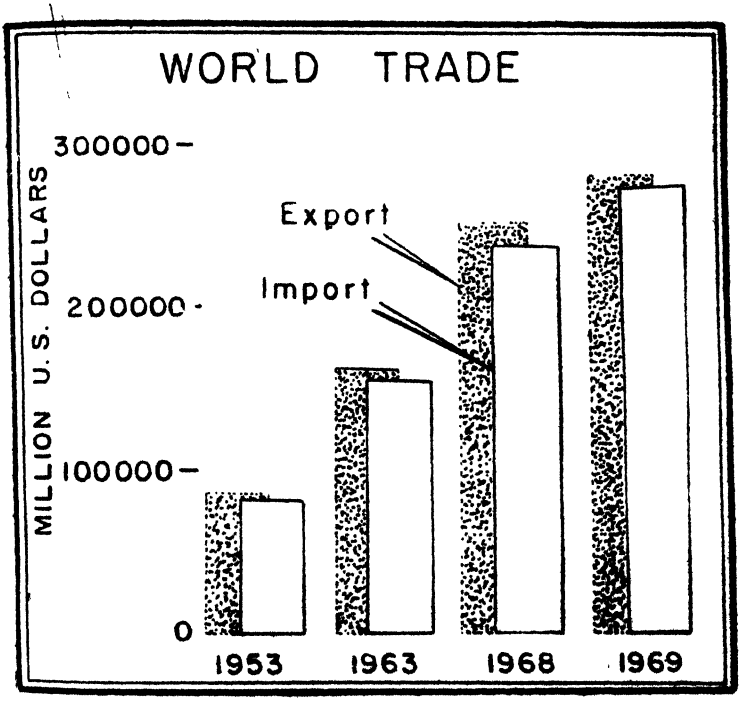


FIG. No. 51. World Trade Exports and Imports

about growth and development of world commerce even in primary products. If there were no political divisions of the ... there would have been always an exchange of certain ...tinct types of goods and products between different geogra-...cal regions because geographical influences do exert strongly the production of certain goods. Many natural resources ...ke minerals and forests are found in certain areas only and

not in others. But this natural flow of trade is hindered or promoted by countries themselves through their trade policies.[2]

Trade policy refers to measures which a country adopts for the purpose of regulating the exchange of goods with other countries in the context of the economic development. Tariffs, quotas and exchange restrictions indicate the structural contents of a trade policy. Trade agreements of a country arise from its trade policy. Trade policy is a means to an end—the end is to secure national welfare.

Trade agreements are generally of two types—bilateral and multilateral. When a country enters into a trade agreement with another country for the sale and purchase of certain specified goods, the agreement is bilateral. Quantity, rates and terms of payment are decided in the agreement. Goods may be bought from markets other than the cheapest and also may be sold for less than the dearest price. Because of the inconvertibility of currencies between the two countries, the need for balancing import by export is emphasised. Bilateral trade agreements are very common between developed and developing countries such as U.S.S.R.-India, U.S.S.R.-Iran, India-Japan and so on. There can be also bilateral trade agreement between advanced countries as in the case of British-Soviet trade agreement. Ordinarily, bilateral trade agreement is entered into for a definite period with provision for extension. Political relations play a very important part in promoting or preventing bilateral trade agreements.

A country can have trade agreements with a number of countries for sale and purchase of goods from the necessity of having convertible currencies. Such multilateral agreements are promoted by international organisations or Associations. The maintenance of convertibility of a country's currency difficult, and therefore such agreements provide scope for converting export surplus to currencies with which gro deficits can be met.

[2] When trade between nations follow naturally without being restricted or impeded by the measures of their government, it means "free trade". If, however, domestic industries are sheltered against foreign competition through regulations by government like imposition of duties on foreign goods or payment of bounties to domestic industries for keeping money at home or for maintaining balance of trade, it is "protection".

Both for bilateral and multilateral trade agreements, *the* *of trade* will determine how much a nation must export exchange for what it imports. The rate at which a country's ports will be exchanged for imports is determined by (*i*) a untry's demand for imports, (*ii*) the foreign demand for intry's exports, and (*iii*) the supply of exports from a intry.

Common Market

Of late, a number of trading blocs in the world are putt- their weight and pressure on the pattern of world trade. European Common Market is the world's largest single oc.

The concept of "Common Market" was developed after 50 as a measure for the development of common economic terests by some countries in Western Europe. The essential atures are the common price levels, common marketing angements and the replacement of national system of protec- n by a common community system, all within an area con- ting of member-countries. It is a kind of a union, formed some countries, which have geographical congruity and cial and economic affinities. Such a community or common arket demand common trade policies and coordination of ancial, commercial, economic and social policies. A com- unity may admit later on other countries as members if their lmission is desirable.

A community or common market is different from an ociation. The former is a close-knit organisation, permitt- often free movement of workers, free movement of capital d free supply of services throughout the Community. The tter aims at achieving some specific objectives through co- eration concerning production, trade and tariffs for the nefit of member-states. The most important example of a non market is that of the European Economic Community. ne instances of Associations are the European Free Trade sociation, and the Latin American Free Trade Association.

European Economic Community or Common Market it is called was set up in January 1958 by Belgium, France, stern Germany, Luxemburg, Italy and the Netherlands as

a result of a treaty in Rome on 27th March, 1957. There is complete custom union with the removal of customs duties trade between the six countries. A common policy for ag culture the basic aims of which are the greater efficiency production, stable market conditions, a fair return for farmers and reasonable prices for consumers has been evolv A system of variable levies on imports of certain farm produ is in operation. In 1968, the community adopted marketi arrangements for all major items. Much work has been do on common transport and trade policies as well as for the ordination of financial, commercial, economic and so policies. In 1969, the six agreed to move towards to an nomic and monetary union.

The treaty forbids agreements or practices which restri prevent or distort free competition.

The community has trade pacts or agreements with number of countries: (*a*) Greece and Turkey which aspire full-membership of the community; (*b*) the Mediterrane countries from Morocco to Israel which are of direct econo and political interest to the Six, two of whom are Mediterran powers; and (*c*) 18 African countries with whom one or oth of the six has historic links. The community has also sign agreement with Argentina. It is also having negotiation w Brazil and Uruguay for trade agreements.

The foreign policy of the community is yet unclear. Ma trading practices of the community are being criticised by U.S.A. It has, now been decided that all commercial ar ments are to be negotiated on a common basis. Till nationally negotiated agreements are subject to the approval the Council of the Community.

New Members : Britain, Ireland, Denmark and Nor which applied for membership once earlier in 1961, have ed the Treaty of Accession in January 1972 to become memb from January 1973.

The Problems of EEC

The entry of Britain, Ireland, Norway and Denmark make the European Common Market more effective dynamic in its operations. The European common market

lready the world's largest trading bloc. The entry of the four ountries will without doubt influence the pattern of the world rade. Till now the trading policies of the EEC have not en very much rationalised. Some founder members of the ommon market have their own political and economic interests n the Mediterranean countries. Among the new members, Britain has similar links with the Commonwealth.

Britain would like to enter into some agreement with Commonwealth countries for special treatment by the Community. The export position of the U.S.A. in the context of he enlargement of the community and the various trade agreements that will follow between the community and others is ifficult to envisage. The U.S.A. did not foresee the enormous mmercial power of the European bloc. Nor, did it foresee vast proliferation of trading agreements between the Comnity and other countries. In 1969, the U.S.A. exported ds worth $6981 million to the European Economic Comnity. In many of the products the U.K. will have an edge r the U.S.A. now, particularly farm products.

The enlarged Community of ten countries will have a ɔulation of over 250 m in an area of 715,000 sq.miles as npared to 205 m population in an area over five times as ge in the U.S.A. on the basis of 1970 statistics, the enlarged mmunity will account for nearly 41 per cent of the world de compared with 14 p.c. for the U.S.A., 6.5 p.c. for Japan l 4 p.c. for Soviet Union.

However, the greatest difference between the Community the U.S.A. lies elsewhere. "As an economic unit, the reɪal disparities in terms of economic development and living ndards are less in the U.S.A. Such factors present striking isimilarities among the members of the Community despite efforts continuously to strengthen the unity of their econoes and to ensure their harmonious development by reducing differences between the various regions and the backward- of the less favoured ones".

When economic growth is slow and large-scale unemployɪt appears, it is the poor regions which suffer most in a ntry or block. It is the responsibility of the national govment to tackle this problem anywhere. So far as the Comnity is concerned it has been doing a great deal to supple-

ment the efforts of the national governments of its member by giving finance and other assistance. With the enlargemen of the Community, this task will call for greater rationale There should not be pockets of poverty in the integrated Com munity.

The inward looking attitude of the community has led t attempts at abolishing internal tariffs and at erecting externa tariffs. Since the Community accounts for 40 p.c. of the world' trade, the developing countries have already been hard hit c preferential access over a very large segment of internationa trade. Even where the Community gives preferences to deve loping countries, the quota ceilings have been kept low. Th Community is not very much aware of the trade needs of th developing countries. It is in this context that India is anxiou to have adequate safeguards for her exports, now that Britai has entered the Community.

Tariffs and other forms of Trade Control

There are barriers to international trade. These barrie may be tariffs and non-tariffs. The General Agreement o Tariffs and Trade (GATT) has two principles on which it working—non-discrimination and reciprocity in trade. Th customs union, free trade areas and other preferential arrang ments that are in vogue throughout the world today do n permit the realisation of the goal of the GATT. The dis minatory measures of the EEC in respect of agricultural go are as much of concern to developing countries as to U.S.A. The formation of customs unions by the EEC followed by the Central American Common Market in 19 and the Arab Common Market (1965). If similar steps taken elsewhere to form customs unions, there will be As Common Market, African Common Market and so on. Su customs unions may be a threat to world trade liberalisatio unless the preferential arrangements are made on carefu considerations of interests both inside and outside the custo unions.

Non-tariff discrimination arises from customs valuatio ational standards and government import licensing and pa yment policies. Also the marketing and packaging regu

ions, export subsidies, import documentations etc. are other on-tariff restrictions.

The most important fact in the world commerce is the peration of a multilateral treaty known as General Agreement n Tariffs and Trade. The Gatt lays down a common code of onduct in international trade and provides a machinery for educing and stabilizing tariffs. It has guarantee of most avoured nations. Much of the work of Gatt has now been ocussed on the need for developing countries to increase their xport earnings and reduce barriers facing their exports.

Recently sixteen countries have signed an agreement be- ween developing countries. It is the first effort to develop nutual trade through preferential concessions. The contract- parties of the general agreement on tariff and trade have pproved this agreement. The initial duration of tariff con- essions is five years (1972-75). Among the signatories are India, Brazil, Spain, Greece, Yugoslavia and Mexico.

World Divisions and World Commerce[3]

World commerce is grouped under two categories: (*i*) World commerce in developed countries, and (*ii*) world commerce in developing countries.

The developed countries are U.S.A., Canada, Western Europe, Japan, Australia, New Zealand and U.S.S.R. The remaining countries of the world are nearly developed or developing or underdeveloped.[4]

SHARE OF WORLD IMPORT TRADE

(In million U.S. Dollars)

	1960	1965	1967	1969
eveloped countries xcluding U.S.S.R.) ...	88,900	110,200	149,240	204,700
eveloping ...	46,000	30,900	42,860	50,100
.S.S.R. ...	5,073	7,059	8,536	10,317
Vorld Total ...	134,900	161,100	227,100	284,700

[3] World trade by regions reveals that Europe has the highest percentage of share both in export and import with more than 50 p.c. in each, followed by North America with 20 p.c. in each.

[4] The developing countries are the challenging trading areas in the world because of the many opportunities for the advanced countries. All are expanding in terms of population and industrial development.

The developed countries share between themselves about 60 p.c. of the world import trade. Among the developed countries, the relative position in import trade is as follows:

(In million U.S. Dollars)

	1948	1958	1968	1969
U.S.A. ...	7,183	13,298	33,066	35,863
U.K. ...	8,070	10,338	18,409	19,336
West Germany ...	1,690	7,730	20,150	24,926
France ...	3,500	5,920	13,927	16,984
Japan ...	684	3,033	12,988	15,024
Total of Developed Regions ...	41,200	73,700	178,400	204,700
World ...	63,600	114,100	251,800	284,700

Thus the "big five" of the developed countries account for about 46 p.c. of the world's total.

In respect of the volume of export trade, the same pattern is more or less noticeable, as the developed countries handled about 49,000 million dollars as against 272,400 million dollars of world export in 1969.

There are certain particular features which affect the growth rate of exports from developing countries. Because of lagging output and increased domestic requirements the quantities available for export are, generally, on the decline. The price unstability on account of difficulties in controlling supplies is another factor for lag in exports. These difficulties will persist so long production remains unorganised and on small-scale basis. Also, switching from commodities which are in chronic surplus to those for which there is a growing demand has been very slow.

THE SHARE OF DEVELOPED COUNTRIES IN WORLD EXPORT TRADE

(million dollars)

	1948	1960	1968	19
U.S.A. ...	12,545	20,383	22,967	37,46
U.K. ...	6,297	9,953	11,414	16,8
West Germany ...	—	11,415	14,617	29,0
Japan ...	258	4,055	5,452	15,9
France ...	1,690	6,862	8,085	14,74
World Total ...	57,400	127,800	153,500	272,6

Developing countries' trade in primary commodities

Primary commodities from developing countries are export- mainly to develop market-economies. About 70 p.c. of develop- countries' exports of food, beverage crops and tobacco are ken by developed countries. In respect of industrial raw aterials from developing countries, the developed countries count for 75 p.c.

Balance of Trade

There are three patterns in the balance of trade: (*i*) Export import may be almost equal as in Cambodia, Sudan, Fin- nd, Uruguay and Peru. These countries export agricultural, storal or forest raw materials and food, and import manufac- red goods.

(*ii*) Exports may be in excess of imports as in Venezuela, gentina, Australia, New Zealand, Indonesia, Czechoslovakia, nada, U.S.A., Saudi Arabia, Iraq, Iran and Soviet Union. countries export highly specialised raw materials like roleum and rubber or manufactured goods (Canada and hoslovakia).

(*iii*) Imports may be in excess of exports as in all European ntries, Japan and India. The imports are mostly raw materials food, and machinery for industrial purposes.

These patterns, however, cannot indicate the degree of in- strial or commercial greatness because in the same pattern may notice countries with different degrees of progress. The U.S.A. has a consistent excess of exports over imports, yearly fluctuations on account of world and domestic eco- ic changes and other disturbing influences. The U.S.A. is only country which has the largest volume of exports and orts. The European countries, on the other hand, have ex- of imports over exports as they are to draw food and raw terials from different parts of the world and have nothing ch to offer except manufactured goods. The unfavourable of trade is made up by earnings from steamships, nce, capital and other service payments.

Imports, exports and foreign capital are of great importance economic growth in the developing countries. In many of

these countries, export trade exerts a considerable influence the over-all growth. Imports are mainly for developing dc tic production and expenditure plans. Often, there is a fore exchange gap between export earnings and import pay Efforts are made to reduce the gap by modifying domestic duction or enlarging export earnings.

Any estimate of future export earnings is fraught with certainties because of the demand conditions abroad and competitive position of foreign suppliers. Since the developi countries concentrate in a few primary commodities, a lit change in demand or supply conditions can bring violent chang in prices. Yet most developing countries project their exp earnings on the assumption that export prices would constant. Also, a number of countries have recently tak several measures to encourage the expansion of exports.

The Foreign Trade and Commerce in U.S.A.

In the early period of her history the characteristic featu of her foreign trade were the import of manufactured goods special articles like tea and silk, and the export of such which could be produced with scarce labour, limited capital abundant natural resources. Tobacco, flour, corn, indigo, forest products and fish were the principal exports. Most the foreign trade was with U.K. which later on spread Europe by 1876. Between 1876 and 1915 Europe was principal buyer of and seller to the U.S.A. During this perio the U.S.A. did not do much to develop trade with her neighbours like Mexico, Central America and the islands the Carribbean. Thus, till 1915, U.S.A.'s economic conditio had profound effect on Europe and not so much on neighbours. The period between 1915 and 1945 was a of intense industrial development and progress in the U.S This enabled the U.S.A. to supply goods and materials to countries in the world after 1947 when the major indus powers were busy in reconstructing their own systems.

At present, the U.S.A. is the leading exporter and imp in the world, and her share in the world trade is about 13 14 per cent.

The enormous favourable balance is adjusted by the imp

of gold, by loans and gifts granted abroad and by increased travels by Americans in foreign countries.[5]

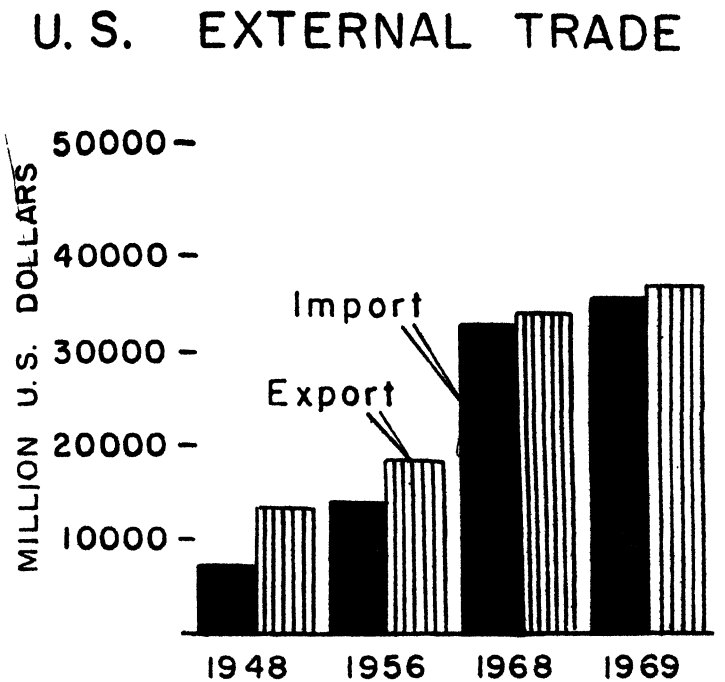


FIG. No. 52. U.S. External Trade

Normally, machinery, grains, chemicals, automobiles and aircrafts account for 60 to 68 p.c. of the total exports. The largest buyer is the Western Europe which took goods worth $12,190 million in 1969. The next important buyer is Canada with the import of $8960 million in the same year. Thus two-thirds of the exports of U.S.A. goes to these two regions. Latin

[5] America's reserves of gold has slumped down considerably recently because of the persistent deficit in the balance of payments. Although U.S. has a normal trade surplus, her investments abroad and her military expenditure in Viet Nam wipe off the surplus and produce a huge deficit on external account. If the deficit continues for long, it is feared that U.S. may restrict conversion of dollar or devalue the dollar. If this happens, there will be a heavy cut in aids to developing countries.

America and Asia excluding Japan occupy the third and the fourth positions respectively.

U.S. EXPORTS TO SELECTED COUNTRIES

(In million U.S. Dollars)

	1958	1968	1969
Canada	3,460	7,950	8,960
West Europe	5,390	10,980	12,190
Japan	980	2,930	3,460
Asian Middle East	500	1,030	1,250
Other Asia	1,920	3,560	3,470
Latin America	4,190	4,660	4,810

Of the total imports, petroleum, non-ferrous base metals (*e.g.*, copper, aluminium, nickel, bauxite and tin), newsprint, wood pulp, textile apparels and machinery account for about 83 per cent of the total. Of late import of alcoholic beverages into U.S. has increased tremendously. Imported whisky, gin and liquors are gaining ever-growing acceptance among American consumers.

IMPORTS FROM SELECTED COUNTRIES 1969

	(In m $)		
Canada	9,800	S. Africa	155
Latin America	4,100	U.S.S.R.	61
U.K.	2,080		
Japan	5,020	West Europe	10,170

Canada, Japan and Latin America account for 50 per cent of the total.

Foreign Trade of Japan

Foreign trade is one of the most important elements in Japan's economy. Industrially speaking, her recent specialities

are in the production of electrical appliances, electronic machinery and chemical industry. Japan has well-organised industries for cotton fabrics, iron and steel, ships and boats and automobiles. In all such goods, Japan enjoys markets in many countries. In 1967, the value of total exports in terms of dollars was $10,440 million, compared to $4,054 million in 1960. In order to feed her enormous population, she has to develop her manufacturing industries and increase exports to obtain more foreign exchange for the purchase of food and raw materials.

Since 1965, Japan is having a favourable balance of trade for the first time. In 1962, the ratio of exports to total national income was 11% and that of imports 13%. These ratios were second only to those of the United Kingdom. In 1967, export ratio to the total national income was above 25 pc.

The exports of manufactured goods account for 80% of total exports, while the exports of raw materials account for 10%. On the other hand, the imports of raw materials account for 48% of total imports, that of foodstuffs 10%, and that of manufactured goods 15%. Thus Japan imports foodstuffs and raw materials, and exports manufactured as well as semi-manufctured goods.

Textiles and textile goods accounted for half of total exports till 1939. Today, their ratio to total export value has been reduced to about 20%. In recent years the heavy and chemical industries have come to occupy a leading position in exports. The value of machinery accounts for about 25% of total exports. Of the total export value, vessels account for 8%, and radio receivers 6%. Sewing machines, cameras and automobiles are also important export items. Recently, imports of mineral fuels and iron ore have shown a great increase. Imports of petroleum accounts for 20% of the total value of imports. Increased domestic production also has called for an increase of the import of light industrial materials.

Direction of Japan's Foreign Trade

Japan's foreign trade extends not only to advanced countries of the West but also to most developing countries. Till

1938, Asian countries had been Japan's major market. The pre-war (1934-36) foreign trade with Asian countries including Formosa and Korea accounted for 64% of total exports and 53% of total imports. In 1967, however, the figures were about 30% and 25% respectively. The pre-war foreign trade with China

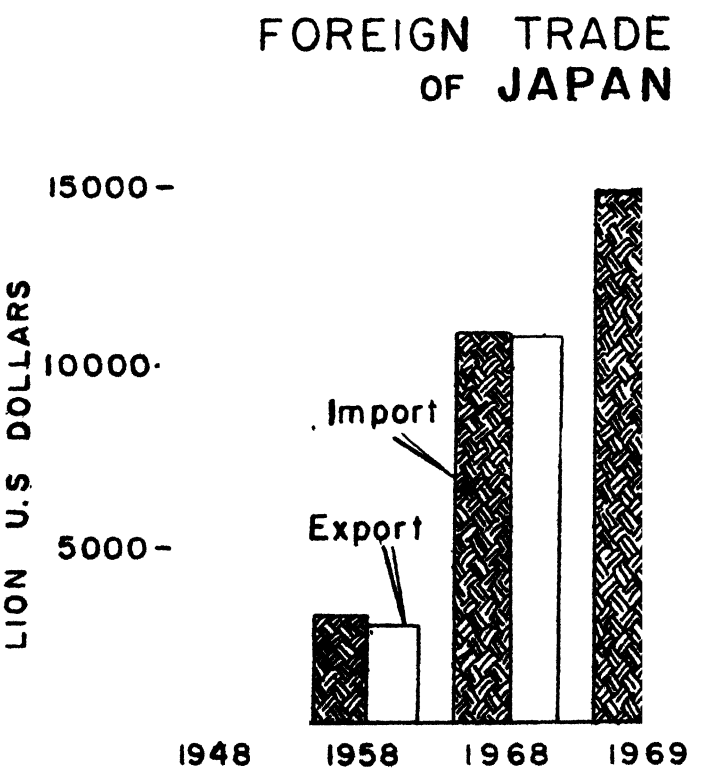


FIG. No. 53. Foreign Trade of Japan

excluding Formosa accounted for 10% of total exports and 10% of total imports. But currently it is only 1% for exports and 1% for imports. In spite of the shift in the direction of post-war trade, Asian countries as a whole are becoming active for Japan.

The greatest market for Japan is the United States.[4] Immediately after the War, Japan's foreign trade heavily depended on the United States. Trade with the United States in 1946 accounted for 65% of Japan's total exports and 86% of her total imports. By 1967, these figures had decreased to 28% and 32% respectively. Next to the United States, the United Kingdom, West Germany and Canada are the principal markets for Japan.

FOREIGN TRADE BY DESTINATIONS, 1969

(In US $ 1 m)

	Exports	Imports
U.S.A.	5,020	3,460
Western Europe	2,070	1,340
Latin America	800	790
South Africa	280	210
Asian Middle East	550	660
U.S.S.R.	270	355
Other Asia	4,450	1,920

Recent problem in export trade. The Japanese government offers export incentives to domestic manufacturers. The major incentive is often a tax exemption for export income. Such a measure, however, reduces tax revenue and is criticised. The problem of export incentives has assumed importance because of U.S.A.'s measure to levy an import surcharge on Japanese goods, and Japan's anxiety to help the exporters.

West Germany

Before the Second World War, the production of industrial goods was mostly confined to the western part of Germany. Because of the Allied bombing during the war, the production

[4] The very broad patterns of Japanese exports is this: one-third goes to U.S.A., another one-third goes to Asian countries and the last third is split between all other countries.

was increasingly shifted to the east of Oder-Neisse and in the present East Germany with the result that when the war was over in 1945, Western Germany was producing hardly 30 p.c. of the 1936 level. Thanks to U.S. aid, West Germany integrated its productive capacity into expanding world economy by 1953.

The statistics of West Germany's industrial production and foreign trade give a picture of not merely the economic revival but also of an example of the effective operation of free enterprise and international co-operation.

West Germany is today a great industrial area—far greater than what it was before the war. The main items of imports are foodstuffs and raw materials because the division of the country has increased its dependence on external sources of supply. Previously, wheat, rye, sugar and timber used to come from areas now in East Germany. However, with the expansion of food production in West Germany after 1960, there is now comparatively less dependence in this regard. Foodstuffs account for about 25 p.c. of the imports. About 50 p.c. of imports is raw materials.

The exports are semi-finished and finished manufactures, which together account for 97 p.c. of exports. Finished goods share 80 p.c. of the total, thus making this group of articles the main vehicle of Germany's export expansion. The extraordinary growth of export trade in manufactures was partly due to the creation of sellers' market after 1956 for such goods in which Germans have had specialised skills. Another factor is that discrimination till 1955 against dollar imports gave opportunity to Germany to get hold of many markets. The monetary policy of the Government and other measures to cover economic risks of exporters also helped the expansion.

The principal sellers to West Germany are U.S.A., France, Netherlands, Italy, Belgium, U.K. and Sweden. The total imports from France, Netherlands, Italy, Belgium and Luxemburg—the five partners of West Germany in the European Common Market, are more than double of what West Germany imports from U.S.A., U.K., U.S.S.R. and Japan. With regard to exports, France is the principal buyer, followed by U.S.A., Norway and Italy.

FOREIGN TRADE OF WEST GERMANY

(In million U.S. Dollars)

	1948	1958	1968	1969
Import ...	1,690	7,730	20,150	24,926
Export ...	780	9,220	24,842	29,052

Foreign Trade of U.S.S.R.

U.S.S.R. is one of the greatest industrial countries of the world, but her share in the world trade is hardly 4 per cent. This low share in the world has always been the main feature of the country's economy, before and after the second world war. What has changed from the past is the direction of the foreign trade along with the composition of goods. Foreign trade is organised as a state monopoly. The U.S.S.R. now maintains business contacts with 70 developing states in Asia, Africa and Latin America. There are inter-governmental agreements on economic and technical collaboration with 39 of them.

The share of Western countries in Soviet trade is about 21 per cent. The traditional exports of Soviet oil products, timber, ore, metal and cotton in return for Western equipment, chemicals, pulp-and-paper goods, etc. have lately been supplemented by far greater imports of consumer goods from Western States and increased exports of machines, equipment and domestic appliances to the West.

FOREIGN TRADE OF U.S.S.R.

(In million U.S. Dollars)

	Exports	World Total	Imports	World Total
1938	251	23,500	268	25,400
1958	4,298	107,900	4,350	113,800
1961	5998	133,600	5,828	140,300
1963	7,271	153,500	7,058	161,100
1967	9,650	214,400	8,537	—
1969	11,655		10,327	

U.S.S.R. has world-wide trade contacts with communist and non-communist countries. Yet her share in the world commerce is still low, because of a number of reasons. First, the country is anxious to attain self-sufficiency, and therefore makes deliberate efforts to restrict her imports by producing many goods within the country as far as possible even though the geographical advantages for their development are limited. Secondly, the country did not want for many years any trade relations with non-communist countries. Thirdly, there are many restrictions against Soviet goods in the U.S.A. and other Western countries. Finally, the increasing demand for domestic consumption leaves a little surplus for export. The foreign trade in U.S.S.R. is conducted on the basis of state monopoly, which means that trade transactions on the purchase and sale of diverse goods with all foreign countries and individual trading enterprises abroad are conducted by organisations specially authorised for the purpose. The U.S.S.R. Ministry of Foreign trade is in the charge of the monopoly and it has enormous power in directing the country's customs system, and in controlling the activities of those institutions which are actually conducting activities in the foreign markets. There are 40 such institutions or organisations each with its responsibility for its operations in export or import or both.[7]

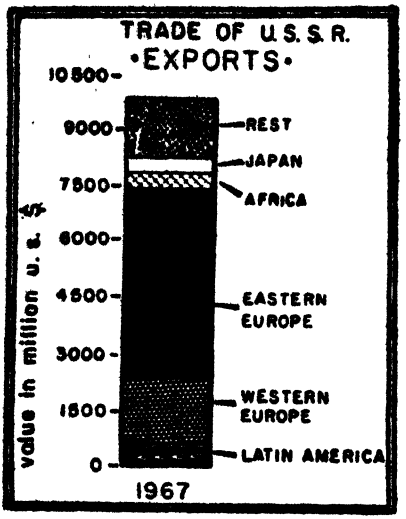


FIG. No. 54 Trade of U.S.S.R.

Before the Revolution, the percentage of goods in the

[7] More than half of the Soviet foreign trade organisations are engaged in the export and import of machines, equipment and instruments. The Soviet Union can today offer for export practically any group of goods manufactured by modern industry. Through corresponding foreign trade organisations, Soviet industry is in a position of supplying any special equipment which can be manufactured on the wish of foreign customers.

export trade was: 64 p.c. raw materials and food, 24 p.c. consumers' goods and 0·3 p.c. machinery and equipment. In 1966 raw materials and food accounted for 50 p.c., consumers' goods 10 p.c. and machinery and equipment 20 p.c. of the total export. In respect of imports also, there has been a great change in the pattern. Imports of fuel and raw materials declined from 50 p.c. to 22 p.c., and those of machinery and equipment increased from 16 p.c. to 40 p.c.

Even in the direction of her trade, the trend is towards East European countries. In 1967, she exported 5040 million U.S. dollar worth of goods to Eastern Europe as against 1810 million dollar worth to West Europe. The U.S.A. share was for only 39 million dollars. The limited trade relations between U.S.S.R. and the U.S.A. are, among others, due to the fact that each has a different economic system.

Of late, some changes in the direction of foreign trade have become noticeable because of the country's interest in developing trade with other areas. In 1969, it exported goods worth $ 2150 million to Western Europe. $ 12 million to Canada and $ 355 million to Japan.

Great Britain has an important place in the foreign trade of U.S.S.R. In 1970, turnover between the U.S.S.R. and Britain totalled 641 million roubles compared with 93 m in 1938 and 270 m in 1960. Moreover, since 1965 Soviet exports to Britain have risen by almost 60 p.c. and British exports to U.S.S.R. by more than 63 p.c. Soviet orders figure prominently in the export of certain branches of British engineering industry. In 1970, deliveries to the U.S.S.R. accounted for 11 p.c. of all British exports of metal cutting lathes. The Soviet Union is also a major purchaser in Britain of equipment for paper mills, of electric furnaces, loading trucks and apparatus for the chemical industry. The Soviet Union traditionally supplies Britain with timber, metal ore, non-ferrous metals, furs and raw-materials for textiles. The Soviet-British long-term trade agreement for 1969-75 emphasises cooperation in developing the industrial capacities for both the countries.

Canada

Canada is a country whose exports and imports almost balance one another. The traditional exports are wheat, lum-

ber, wood pulp, fish, other grains, asbestos, nickel, iron ore and copper. She imports machinery, automobiles, engines, aircrafts, plastics, sugar, paper, farm implements and cotton fabrics.

In recent years there has been a shift in Canada's composition of trade. Because of the expansion of hydro-electricity and development of base metals, oils and forest products, the exports of newsprint, machinery, aircraft parts, natural gas, chemicals and motor vehicles have considerably increased. At the same time, there has been a decline in the export of traditional items. Another shift is in the direction of trade. The Canadian trade is directed more to the U.S.A. than to Europe. With the exception of wheat, all agricultural products are exported to U.S.A. or consumed in the country because of increasing population.

FOREIGN TRADE

(In million dollars Canadian)

	Import	Export
1958	5,050	4,791
1960	5,483	5,256
1968	11,431	12,602
1969	13,070	13,796

The principal buyers of Canadian goods in 1969 were, in order of importance, U.S.A., U.K., Japan, U.S.S.R., West Germany, Australia, Netherlands, China and France. During the same year, the best sellers to Canada were U.S.A., U.K., Japan and West Germany.

EXPORT AND IMPORT (YEAR ENDING 1969)

(In 1 million dollars)

	Export		Import
U.K. ...	1,030	U.S.A.	8,960
U.S.A. ...	9,800	U.K.	720
Latin America ...	430	South America	460
Western Europe ...	2,130	West Europe	1,730
U.S.S.R. ...	9	Japan	480
India ...	140	Australia	70
Japan ...	580	Middle East	81
South Africa ...	74		
Middle East ...	39		

Foreign Trade of Great Britain

No other country in the world, with the possible exception of Japan, depends so much on foreign trade for economic stability as Great Britain. Her limited natural resources coupled with her small size and large population make it imperative for her to import food and raw materials and export manufactured and processed goods.

Her expansion of trade began in the second half of the sixteenth century with the discovery of passages to North America and the East. By 1873, Britain was looked upon as the workshop of the world. The World War I had an unfavourable effect on British economy and her export trade. It became almost impossible to regain her former position in export in view of currency restrictions or tariff barriers on imports in many countries after the First World War. In 1932 she herself introduced a general system of fiscal protection for the first time in her history against imported goods. She also entered into a number of bilateral trade agreements. The World War II brought further changes in her export trade. Her inability to supply goods during the war made her customers who were not involved in the war depend on other sources near their countries. The position could not be improved after the war because her customers did not want another changeover. Britain is a strong advocate of the removal of artificial barriers to trade and for this has taken an active part in setting up such organisations as the International Monetary Fund and GATT.

Today, there are changes both in respect of her composition and distribution of exports. The traditional items like textiles and coal are less important, and the major portion is accounted for by engineering and other new products. The U.S.A. has taken the place of Australia as the leading buyer of British goods. The other important buyers are Canada, Australia, New Zealand, India, West Germany and South Africa. Very recently, France has become an important customer of British goods. In the first six months of 1969, France's position was third after U.S.A. and West Germany, but much ahead of Australia, Canada and South Africa. This increase in share is for engineering goods mostly.

The British produce is grouped under (*a*) food, beverages, and tobacco, (*b*) basic materials, (*c*) mineral fuels and lubricants and (*d*) manufactured goods and machinery.

80 to 90 p.c. of the exports consist of manufactured goods and machinery.

So far as imports are concerned, food, beverage and tobacco account for one-third and another one-third by manufactured goods.

She is the best *customer* of the U.S.A., Canada, Pakistan, India, Netherlands, Australia, Sweden, Argentina, South Africa, Denmark, and New Zealand; *the second best* of Germany, Switzerland and Malaysia, and the *third best* of France and Brazil. Thus the prosperity of many countries whose economies are dependent upon a flourishing export trade is bound up with the prosperity of Great Britain as the world's best customer.

The principal sources of import between 1961 and 1970 were the following:

IMPORT TRADE BY PRINCIPAL COUNTRIES

(In £ million)

	1961	1965	1967	1970
U.S.A. ...	485	640	803	1,170
Canada ...	349	452	457	683
Australia ...	174	250	175	200
West Germany ...	194	266	339	549
Netherlands ...	173	236	329	459
Sweden ...	161	209	248	371
New Zealand ...	160	208	186	260
India ...	145	141	126	106
France ...	143	184	255	365
All Total ...	4,395	5,513	6,441	4,051

It is thus observed that U.K. has trade contacts with many countries of the world, and her dependence on any single country is not more than 10 to 12 p.c. of the total imports.

Sources of British Imports

Food

Wheat: Canada, Argentina, Australia.
Rice: Burma, Thailand, Spain.
Sugar: Cuba, Australia, Mauritius.
Tea: India, Pakistan, Ceylon, Java.
Coffee: East Africa, Costa Rica, Brazil.
Cocoa: Ghana.
Beet: Argentina, Uruguay, Brazil, Ireland.
Mutton: New Zealand, Australia, Argentina.
Butter: New Zealand, Denmark and Australia.
Cheese: Netherlands, Canada, New Zealand.

Basic Materials

Cotton: U.S.A., Sudan, Egypt, Pakistan.
Jute: Bangladesh.
Flax: U.S.S.R., Belgium, Baltic States.
Wool: Australia, New Zealand, South Africa, Argentina.
Wood: Sweden, Finland, Canada, U.S.S.R.
Rubber: Malaysia, Indonesia, Ceylon.
Iron ore: Spain, Algeria, Sweden.
Tin: Malaysia, Bolivia, Chile, Nigeria.

The principal export markets of the United Kingdom extend to many countries of all the continents.

One noticeable fact about Britain's trade is that more than 25 p.c. of it is shared by western European countries. One-sixth of her exports goes to the United States.

Export of British produce, 1970

(In £ million)

U.S.A.	933	India	...	49
Canada	288	New Zealand	...	129
Australia	346	Italy	...	340
West Germany	503	France	...	339
Sweden	364	All-Total	...	8,062
Netherlands	378			

The present composition of Britain's exports maintains the trend in favour of engineering exports against traditional exports, such as textiles, which has been a characteristic of recent years. Engineering goods (machinery, vehicles, and ships' instruments) which before the war accounted for about

25 per cent of the total value of exports, have now increased to about 46 per cent. During the same period, the exports of cotton textiles came down to 11 p.c. from 32 p.c. of the total exports.

This change in the composition of Britain's trade is due to increased demand for "scientific" things like machine tools, vehicles, tractors, instruments, machinery etc. from many under-developed countries which having made some progress in textiles, foundries etc. are now *en route* to further industrialisation. In fact, the future of British exports and their growth will be along *scientific industries.*

Among other exports which—in addition to engineering products—have become of increasing importance, chemicals take first place. Together with exports of refined petroleum products (an industry established in Britain after the war) they now represent over 10 per cent of total exports. This increasing emphasis on "new" against "traditional" exports shows the resilience of Britain's economy, which is well able to adapt itself to the new conditions in world markets arising from the establishment of local consumer goods industries in many less industrialized countries.

EXPORT TRADE BY COMMODITIES

(In £ million)

	1961	1965	1966	1967	1970
Machinery and transport equipment ...	1,626	1,825	2,178	2,107	3,301
Textile yarn and fabrics ...	246	275	261	250	397
Chemicals	327	412	469	493	766
Iron and steel	212	218	215	229	348
Beverages and Tobacco ...	104	123	159	163	265
All Total	3,682	4,254	5,012	5,210	8,062

The United Kingdom no longer depends on the Commonwealth countries for maintaining a high rate of growth in her foreign trade. In 1970 she exported to Commonwealth countries only about 20 p.c. of her total exports, and imported about 30 p.c. of her total imports from the Commonwealth countries.[8]

[8] The impact of six-nation European Common Market (West Germany, France, Italy, Belgium, Holland and Luxemburg) was keenly felt in

In her trade relation with Commonwealth countries, only Canada, Australia and New Zealand are having an increasing rate of shares. Conversely, the developing countries in the Commonwealth show declining trends in their exports and imports to and from U.K.

Some General Considerations about the British Foreign Trade

(*i*) The traditional items of exports like textiles have yielded place to engineering goods and chemicals. The increased demand for products of engineering industries from the developing countries is responsible for this change in the composition. The opening of oil refineries has also made Britain an exporter of refined petroleum products.

(*ii*) There is a distinct relationship between cost of production at home and export prices. The competition with West Germany and Japan is based on the price factor, and often Britain is comparatively at a disadvantage.

(*iii*) Her interest in promoting multilateralism and freer dealings in international trade has been dictated by the urgent need to strengthen the balance of payments through increase in exports.

(*iv*) The relative advantages which she enjoyed for more than three centuries in respect of world commerce have almost disappeared and there are now many competitors in the world markets. At the same time, she must export to pay for her imports. This is a challenge which Britain can meet not only by her monetary and fiscal policy but also by raising the productivity of her industries.

The chief competitor of Britain in the World markets is Japan. U.K.'s traditional markets like Australia, South Africa and India are much in the hands of Japan. Even in U.S.A., the position of Japan has become stronger in many commodities vis-a-vis those from U.K. Already the penetration of Japanese cars in U.S.A. is a challenge to British cars.

The recent devaluation of sterling has brought optimism about export prospects at a high level. It is, however, difficult

Britain's foreign trade and her domestic economy. U.K. therefore made an agreement with the Scandinavian countries, Switzerland, Austria and Portugal on the formation of a European Free Trade area.

to judge from this optimism how much of a boost devaluation will give to export orders and shipments. The boost to export opportunities has to be balanced against the general prospects of higher costs and further consumer curbs. Orders and production schedules are rising, no doubt, but costs are also increasing sharply. There is little doubt that engineering goods industry will have better prospects. In chemical group and in shipping and ship-building, the future is to be viewed more cautiously.

The export trade and virtually all the import trade of U.K. are carried on by private firms. A great deal of export trade is conducted through export merchants.

The Pattern of India's Foreign Trade[1]

Although India's share in the world trade is hardly 2 per cent., the importance of foreign trade to India is of the greatest magnitude in view of her economic policy, aiming at self-reliance and industrialisation. The enlargement of the volume and range of exports is the main consideration. The balance of trade has, however, remained unfavourable because of the imperative need for imports of food grains, machinery, petroleum and various other raw materials in which India is in short supply. The increasing efforts to raise the volume and range of exports are not being adequately compensated on account of the tariff restrictions in many countries and the intensity of competition in the world market. The high cost of production in respect of goods to be exported and the growing domestic consumption

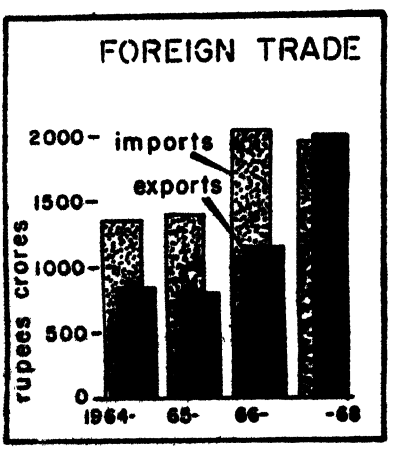


FIG. No. 55 India's Foreign Trade.

[1] The figures are from Economic Survey, Government of India, 1971-72 ; India, 1971, Publications Division.

of goods which can be exported impel the producers to concentrate in the internal market from profit motive.

VOLUME OF FOREIGN TRADE AND TRADE BALANCE

(in million Rupees)

	Import	Export	Deficit balance
1961-62	11,071	6,795	4,276
1963-64	12,228	7,932	4,296
1965-66	13,923	8,095	5,827
1967-68	19,742	11,986	7,756
1968-69	18,610	13,600	5,010
1969-70	15,675	14,132	1,453
1970-71	16,252	15,352	—

The principal imports are iron and steel, electrical machinery, machinery other than electrical, transport equipment, mineral fuels, chemical elements, food grains, and fertilisers.

The principal exports are tea, jute manufactures, cotton manufactures, iron ore and concentrates, leather and leather manufactures, oil cakes, cashew kernels, sugar, tobacco, spices, coffee, coir fibres, manganese ore, raw cotton and iron and steel.

There is a huge gap in India's foreign trade, which is being met by aid from abroad. In addition, the debt burden because of interest and repayment charges on borrowings since 1958 has been growing. While import needs cannot be curtailed to a considerable extent in view of her growing economy, the export promotion are yet to reach a satisfactory level to plan for balance of payments. Thus the magnitude of problem is great.

CHARACTERISTICS OF EXPORT TRADE

The characteristics of India's export trade are reflected in continuance of traditional articles, steady emergence of a new series of manufactured goods, active participation of the Government in export promotion, large share of percentage by a few countries and a world-wide distribution of markets.

1. *Traditional Exports*:

India is noted in the international markets for the export of commodities like cotton piece goods, jute goods, tea, leather goods, tobacco, spices, mica, coffee, manganese ore and iron ore. In fact these are the *traditional commodities* for export from India.

In respect of tea and cotton piece goods, the percentage share to total production is on the decline although in terms of actual volume there has not been much change. In the case of mica, the percentage of export is higher than what the annual raisings are. The share of export in coffee is steadily increasing and has reached almost 50 p.c. of total production. The percentage share of selected exports to production is normally as follows:

Tea 58, cotton fabrics 11, jute 91, tobacco 19 and coffee 48.

Tea, jute and cotton manufactures accounts for 15 p.c., 21 p.c. and 13 p.c. respectively of the total exports from India. Iron ore accounts for about 5 p.c. of the total value of exports. Iron ore offers excellent opportunities for export but the main difficulty is the inadequate transport facilities for its movement.

EXPORT BY COMMODITIES (In lakhs of Rupees)

Commodities	1960	1965-66	1967-68	1970-71
Jute Manufactures ...	10,924	18,163	28,353	19,040
Tea ...	11,999	11,484	18,020	14,830
Cotton Textiles ...	5,754	6,329	7,944	7,530
Raw Cotton and Waste	1,075	1,309	1,475	1,400
Leather and Leather Manufactures ...	2,575	2,821	5,322	7,200
Iron Ore and Concentrates ...	1,613	4,210	7,478	11,730
Tobacco ...	1,584	1,958	1,485	3,620
Coffee ...	950	1,294	1,818	2,510
Hides and Skins ...	858	955	739	380

Jute manufactures constitute the largest single item of export. One single item whose export is on the increase is

iron ore. As against 1 million tons in 1955 and 2 million tons in 1958, the volume is now about 14 million tons, valued at Rs. 88 crores (1968-69). Exports of handicrafts reached the record figure of Rs. 69 crores in 1968 (calendar year). In the same year, the export of cashew kernel was valued at Rs. 62 crores.

2. *Prominence of Manufactured Goods in Recent Years*:

Of late, a number of new manufactured articles are being exported from India. Though the total value of such articles is not large, they hold out possibilities of further expansion with rapid industrial development in the country. This new trend is also changing the pattern of India's export trade from being solely the exporter of raw materials and traditional commodities. The new engineering items included bicycles, sewing machines, electric fans, metal and metal manufactures and machinery. In 1970-71, the value of engineering goods exported was Rs. 116 crores as against Rs. 8 crores in 1961.

The two characteristics in the export of engineering goods are the wide range of equipment and the geographical spread. The Afro-Asian market holds out great possibilities for Indian engineering goods because this market is less sophisticated, and more easy to reach. However, this market is very much brand conscious and needs long term credit, in both of which India has disadvantages.

The other items which are showing export performance are pig iron, soaps, paints, rubber tyres, woollen and worsted fabrics, razor blades, cigarette paper, vanaspati, medicine and pharmaceuticals.

2. *Government's participation in Export Promotion*:

The formation of State Trading Corporation in 1956 and the Minerals and Metals Trading Corporation in 1963 by the Government of India has added a distinct pattern to the export trade of India. Since its inception, the State Trading Corporation has been striving to increase India's export to countries with controlled economies and to secure from them raw materials without straining the country's foreign reserves. It has also succeeded in bringing about diversifications of India's exports and developing new markets for traditional and non-traditional

export items. The State Trading Corporation introduced in the world market the products of India such as cycles, sewing machines, steel furniture, razor blades, shoes, diesel engines, woollen hosiery and film projectors.

The main objects of the Mineral and Metal Trading Corporation are to organise and undertake export of mineral ores and import of metals, and develop new markets for export of minerals for diversification and expansion.

The Government of India seeks to create conditions in which export trade can flourish. A number of fiscal concessions have been granted in order to make Indian goods more competitive in foreign markets. These include (*i*) abolition of export duties on groundnut oil, castor oil and manganese ore, and reduction in levels of duties on raw cotton and tea; (*ii*) grant of rebate of 50 per cent on freight for a number of commodities transported by rail from interior to the ports. Reduction in freight rates have also been secured from the Shipping Conference on a number of commodities. Export Promotion Councils have been set up for cotton textiles, silk and rayon, engineering goods, chemicals, tobacco, spices, cashew, leather, plastics, sports goods and mica. There are Commodity Boards for tea, coffee and coir. Recently a Board of Trade has been established to formulate the lines on which expansion and diversification of trade should take place. Export Promotion Councils undertake studies of foreign markets, send out trade delegations and do trade publicity abroad. They also lay down standards of quality and packing of goods for shipment abroad. Many countries have an out-of-date image of India as a country exporting raw materials and tropical products. It is necessary to create a new image of India as a producer of manufactured goods which maintain high standard of business integrity.

4. *A Few Big Buyers of Export*:

About 50 to 60 per cent of India's exports are shared by U.K., U.S.A., U.S.S.R., and Japan. The other important buyers are Australia, Ceylon, Germany (West), Canada, Burma and Egypt. These ten countries take about two-thirds of India's exports.

DIRECTION OF EXPORTS: (Rs. crores)

Country	1961-62	1964-65	1967-68	1969-7(
U.K. ...	160	166	229	164
U.S.A. ...	115	146	207	238
Japan ...	40	61	136	179
U.S.S.R. ...	32	78	122	176
Ceylon ...	17	14	15	25
Germany (West)	20	18	22	30
Australia ...	16	20	28	24
Burma ...	5	6	4	21
Canada ...	18	17	30	26
Egypt ...	13	14	22	37
Czechoslovakia ...	8	16	29	30

Region-wise India's exports to Asian and Oceania countries were valued at Rs. 412 crores in 1969, to ECAFE countries at Rs. 244 crores, to West Asian countries at Rs. 67 crores, to East European countries at Rs. 266 crores, to U.S.S.R. at Rs. 148 crores, to West Europe at Rs. 339 crores and to Africa Rs. 73 crores.

U.K. has always been the best customer of certain Indian goods like tea, dressed leather, unmanufactured tobacco, cotton cloth and jute manufactures. In the case of tea, cotton fabrics, tobacco, leather, and oil cake, she ranks first in the list of India's importers.

COMMODITY-WISE SHARE OF U.K. IN INDIA'S EXPORT (1964-68)

(Percentage: Average record)

Tea ...	... 60	Tobacco (Unmanufac-	
Cotton Fabrics	... 28	tured) ...	... 40
Jute Manufactures	... 4	Sugar ...	... 10
Dressed Leather	... 45	Cashew Kernels	... 6

From the point of view of value, U.S.A. has been the best customer of Indian goods. She accounts for about 16 to 17 per cent of the total exports of India.

COMMODITY-WISE SHARE OF U.S.A. IN INDIA'S EXPORTS
(1964-68)

(in percentage : Average record)

Cotton fabrics ...	15	Leather	10
Sugar	20	Cashew Kernels ...	55
Manganese ore ...	26	Jute Manufactures ...	45

Japan with a share of a little more than 6 per cent of India's exports occupies the fourth place among India's customers.

COMMODITY-WISE SHARE OF JAPAN IN INDIA'S EXPORTS
(1964-68)

(in percentage : Average record)

Iron Ore	78	Oil Cakes	4
Raw Cotton	70	Leather	8
Manganese Ore ...	35	Tobacco	5

Soviet Union with which the trade was insignificant a few years ago has taken the third place among the buyers of India and eighth place among sellers since 1966. From Rs. 32 crores worth of exports in 1962 the value was Rs. 176 crores in 1970.

COMMODITY-WISE SHARE OF U.S.S.R. IN INDIA'S EXPORTS
(1964-68)

(in percentage : Average record)

Tea	12	Cashew Kernels ...	25
Jute manufactures ...	12		
Tobacco	35	Oil cakes	5

(a) *Jute manufactures* account for about 15 to 20 per cent of the total exports from India. U.S.A. alone takes about 40 p.c. of our jute. Foreign exchange earnings from jute manufactures in 1970-71 was Rs. 190 crores.

JUTE DESTINATIONS: (1964-68)

	(in percentage : Average record)		
U.S.A.	46	U.K.	5
U.S.S.R.	12	Argentina	5
Canada	6	Czechoslovakia	3
Australia	8	Others	10
Egypt	5		

(*b*) *Tea* accounted for about 10 to 15 p.c. of the total export value. U.K. is the leading buyer of Indian Tea. The most interesting fact is the recent entry of U.S.S.R. as a buyer of Indian Tea.

TEA DESTINATIONS: (1964-68)

	(in percentage : Average record)		
U.K.	60	Ireland	3
U.S.S.R.	15	Netherlands	2
Egypt	8	Iran	2
U.S.A.	5	Others	12
Canada	4		

The foreign exchange earnings from tea came to about Rs. 148 crores in 1970-71.

(*c*) *Leather.* The leading importers are U.K., West Germany, U.S.A., Italy and France. In 1970-71, India earned Rs. 72 crores as foreign exchange from the export of leather.

LEATHER DESTINATIONS: (1964-68)

	(in percentage	Average record)	
U.K.	48	France	5
West Germany	12	Japan	7
U.S.A.	12	Yugoslavia	5
Italy	8	Belgium	2
		Others	1

(*d*) *Cotton fabrics* occupy the fourth place as an earner of foreign exchange, even though its value has come down to Rs. 75 crores in 1970-71 compared to Rs. 137 crores in 1950.

5. *Geographical Distribution of Export Market* :

In spite of the fact that more than 50 p.c. of India's total exports goes to the U.S.A., U.K., U.S.S.R. and Japan, India's

markets are widely scattered all over the world. Her markets are divided into six regions on the basis of the degree of fiscal restrictions and methods of payment involved in the foreign trade.

COTTON FABRICS DESTINATIONS: (1964-68)

(in percentage : Average record)

U.K.	...	...	28	Aden	...	...	3
U.S.A.	...	...	15	New Zealand		...	3
Australia	...	...	5	Sudan	...	...	2
				Tanzania	...	...	2
Ceylon	...	...	4	Canada	...	...	2
Kenya	...	...	3	Others	...	...	33

(*i*) *Free Trade Area*: U.K., Norway, Sweden, Switzerland, Denmark, Austria and Portugal. These countries participate as parts of the common market through the elimination of internal barriers to trade and have not adopted a common external tariff. The area takes about 22 per cent of India's exports annually of which U.K. alone accounts for 20 per cent.

(*ii*) *The European Common Market*: West Germany, Netherlands, Belgium, Luxemburg, France and Italy constitute the European Common Market. From 1973, U.K., Ireland, Norway and Denmark will be the regular member at the common market. A reason for the creation of the common market is to unleash latent forces of growth which at present are confined in the cramped contours of small national markets. In spite of its preferential tariff system which discriminates against others, the region has become an important customer of India and takes about 8 per cent of India's exports in 1964-65. Germany (W) is the largest buyer of Indian goods and takes about 2 p.c. of India's exports. France was once a good customer for Indian groundnut, coffee and short staple cotton. Though exports of these commodities have fallen considerably, there are fair prospects for jute goods, cotton textiles, handicrafts, tobacco and tanned hides and skins. Belgium takes bones, animal hair, woollen carpets, jute goods, manganese, coffee and mica. There is good scope for exporting footwear and handicrafts. India's trade with Italy is of a complementary character inasmuch as each country is mainly exporting pro-

ducts which the other is not producing. India exports jute, coffee, tea, manganese and spices.

(*iii*) *The ECAFE* Region consists of Pakistan, Burma, Ceylon, Malaysia, Singapore, Indonesia, Japan and Afghanistan. About 22 per cent of exports are sent to this region. However, the share of ECAFE in India's export trade has been a fluctuating one, though the balance of trade is in favour of India. Because of the closure of the Suez canal, the volume and value of exports to this region increased to Rs. 344 crores in 1968-69 compared to Rs. 270 crores in 1967-68.

(*iv*) *Rupee Payment* Area comprises U.S.S.R. and East European countries. The trade with this region is on the increase as a result of closer trade relations. Its share is between 15 and 18 p.c. a year in the total exports from India. This is a region to which India is giving her most serious attention to expand her exports.

(*v*) *The African Region*: As yet, the share of Africa in India's export trade has not gone beyond 7 p.c. Nigeria, Kenya, Sudan and U.A.R. are the best customers of this region. The possibility of expanding the export of non-traditional goods in this area is vast. Of late, there has been some increase in exports to Ghana, Libya, Uganda and Tanzania.

Apart from the conventional export items, viz., tea, jute manufactures and cotton piecegoods, in the last few years India has offered a wide range of newly manufactured goods such as light engineering products, pharmaceutical and chemical manufactures, footwear, vanaspati, art silk, piecegoods, carpets and rugs, etc.

(*vi*) *America*: U.S.A. and Canada are the two countries with which India has most of her trade. In 1967-68, exports to these countries amounted to Rs. 236 crores, of which U.S.A. accounted for Rs. 206 crores.

Characteristics of Imports

The composition and size of India's imports are determined by the requirements for developmental programmes, essential raw materials and food. The characteristics of imports are, therefore, the predominance of food, industrial machinery and

equipment, steady decline in the import of agricultural raw materials and consumer goods, steady rise of mineral fuels, iron

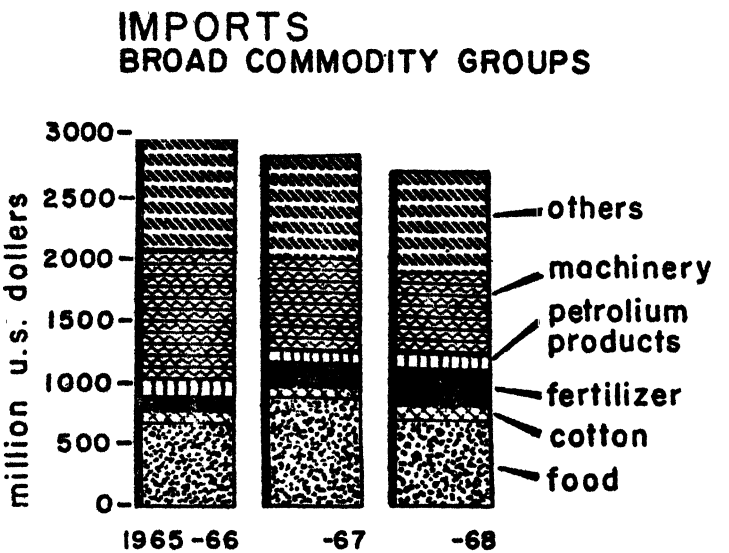


FIG. NO. 56. Imports.

and steel and non-ferrous metals. In 1970-71, the value of total imports was Rs. 1,652 crores of which cereals and cereal preparations accounted for Rs. 393·8 crores.

PRINCIPAL IMPORTS: COMMODITY-WISE

(In crores of rupees)

	1968-69	1970-71
Food	336·6	213
Cotton	90	98·8
Jute	9·3	0·1
Animal oils and fats ...	19	38·5
Fertilisers	198	99.9
Petroleum products ...	133	136
Metals	175	266·7
Machinery & Equipment ...	513·9	384·5
Others	432·7	387·7
Total	1,908·6	1,625

I. Predominance of Capital Goods and Related Items

In the present composition of imports, manufactures of metals, non-electrical machinery, electrical machinery and transport equipment for industries figure prominently because of the rapidly developing economy. Such materials and components are essential for the maintenance of production. There are considerable restrictions on imports of items which are being manufactured in the country or the production of which has expanded recently.

Most of the industries in the private sector, particularly, jute, sugar and cotton textile mills are bringing about replacement of obsolete machinery. In the public sector, too, machinery and equipment are being imported for new industries. In 1970-71 India imported capital goods valued at Rs. 393.8 crores.

II. Slow Decline in the Import of Raw Materials and Intermediate Goods

It is necessary to import raw cotton, raw jute, raw rubber and raw wool, fertilisers, paper, iron and steel and various other intermediate goods to meet the internal requirements. In spite of the various efforts which the country has made to increase the domestic production, the imports of these commodities have not declined. There has been decline only in the imports of consumer goods, more particularly those in which India's production has caught up with the domestic demand. In 1970-71, the value of raw materials was Rs. 891.5 crores.

III. Dependence on Imported Food-grains

In spite of the expansion of agricultural areas and production, the dependence on foreign supplies of food is continued. The imports are dairy products, fish, wheat, rice, other cereals, preserved fruits, other fruits and vegetables, beans and meat. The total value of cereals in 1970-71 was Rs. 214 crores compared to Rs. 336 crores in 1968.

IV. Geographical Distribution of Imports

U.K., U.S.A. and West Germany account for more than 60 per cent of India's imports. It is interesting to note that

equipment, steady decline in the import of agricultural raw materials and consumer goods, steady rise of mineral fuels, iron

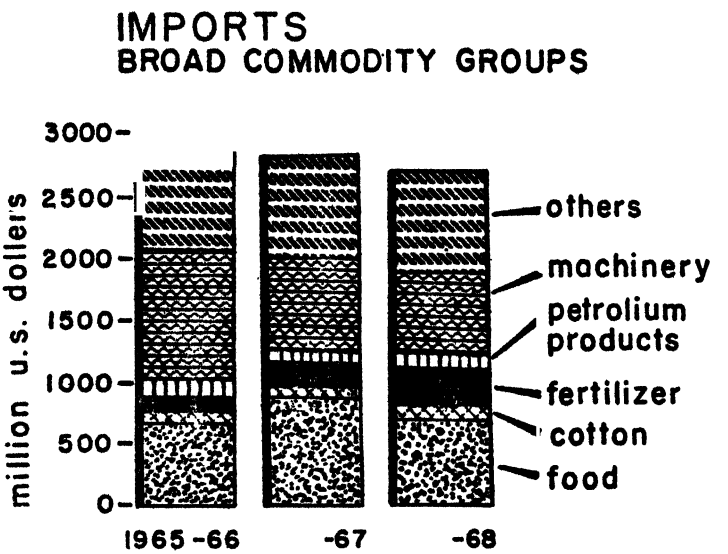


FIG. No. 56. Imports.

and steel and non-ferrous metals. In 1970-71, the value of total imports was Rs. 1,652 crores of which cereals and cereal preparations accounted for Rs. 393·8 crores.

PRINCIPAL IMPORTS: COMMODITY-WISE

(In crores of rupees)

	1968-69	1970-71
Food ...	336·6	213
Cotton ...	90	98·8
Jute ...	9·3	0·1
Animal oils and fats	19	38·5
Fertilisers ...	198	99.9
Petroleum products	133	136
Metals ...	175	266·7
Machinery & Equipment	513·9	384·5
Others ...	432·7	387·7
Total ...	1,908·6	1,625

I. Predominance of Capital Goods and Related Items

In the present composition of imports, manufactures of metals, non-electrical machinery, electrical machinery and transport equipment for industries figure prominently because of the rapidly developing economy. Such materials and components are essential for the maintenance of production. There are considerable restrictions on imports of items which are being manufactured in the country or the production of which has expanded recently.

Most of the industries in the private sector, particularly, jute, sugar and cotton textile mills are bringing about replacement of obsolete machinery. In the public sector, too, machinery and equipment are being imported for new industries. In 1970-71 India imported capital goods valued at Rs. 393.8 crores.

II. Slow Decline in the Import of Raw Materials and Intermediate Goods

It is necessary to import raw cotton, raw jute, raw rubber and raw wool, fertilisers, paper, iron and steel and various other intermediate goods to meet the internal requirements. In spite of the various efforts which the country has made to increase the domestic production, the imports of these commodities have not declined. There has been decline only in the imports of consumer goods, more particularly those in which India's production has caught up with the domestic demand. In 1970-71, the value of raw materials was Rs. 891.5 crores.

III. Dependence on Imported Food-grains

In spite of the expansion of agricultural areas and production, the dependence on foreign supplies of food is continued. The imports are dairy products, fish, wheat, rice, other cereals, preserved fruits, other fruits and vegetables, beans and meat. The total value of cereals in 1970-71 was Rs. 214 crores compared to Rs. 336 crores in 1968.

IV. Geographical Distribution of Imports

U.K., U.S.A. and West Germany account for more than 60 per cent of India's imports. It is interesting to note that

U.S.A. which was India's second best source till 1958 is now the first in importance with more than one-third of India's imports.

IMPORTS: (Rs. crores)

	1961-62	1965-66	1967-68	1969-70
U.S.A.	256	525	772	460
U.K.	200	149	158	100
West Germany	123	137	143	84
U.S.S.R.	40	83	96	170
Italy	26	19	34	40
Japan	59	79	107	67
Canada	19	31	98	74
Australia	24	24	65	31
Egypt	12	20	27	21
Kenya	12	5	8	5
Total imports	1,090	1,392	1,974	1,908

From the point of view of India's import trade, the Afro-Asian countries occupy pivotal position in the supply of certain items, such as crude petroleum, raw cotton, manila hemp, rock phosphate, dates and cloves. More than 50 p.c. of India's imports of important non-ferrous metals like copper and zinc are also from this region. In the case of commodities like raw cotton nearly two-fifths of India's total imports come from these countries.

V. Commodity-wise Sellers

India's growing manufacturing capacity enables certain imports to be replaced by domestic products. Among the many industries in which manufacturing capacity has been installed or expanded during the Second Plan and Third Plan periods, are the manufacture of medicinal and pharmaceutical products, internal cumbustion engines, electric cables, locomotives and cycles. The examples of jute spinning machinery and cement making machinery are typical of changes in many items of trade where domestic production is replacing imports.

(*a*) *Machinery*: The chief suppliers are U.K., West Germany, U.S.A., Japan, France, U.S.S.R., etc. The U.K. is the largest supplier. The machinery includes textile machinery, in-

ternal combustion, diesel, machine tools, power generating machinery, agricultural machinery and tractors, paper mill, pulp machinery and electrical machinery.

(*b*) *Transport equipment*: The U.K., the U.S.A., Canada, West Germany, Italy and France. The equipment includes railway locomotives, buses, trucks, lorries, passenger and road vehicles, etc.

(*c*) *Mineral Oil*: Iran, Iraq, Saudi Arabia, Indonesia.

(*d*) *Paper and Pasteboard*: The U.K., West Germany, Sweden, Norway, the U.S.A.

(*e*) *Art Silk Manufactures*: Japan, Italy, U.K., etc.

(*f*) *Chemicals*: U.K., West Germany, Japan and the U.S.A.

(*g*) *Raw cotton*: Arab Republic of Egypt., the U.S.A., Kenya.

(*h*) *Grains and flour*: Canada, Australia, Burma, the U.S.A., Argentina, Thailand and A.R.E.

The share of imports in the total estimated supplies in 1970-71 was as follows in terms of percentage: foodgrains 3.3 p.c., raw cotton 12 p.c., raw jute 4 p.c., aluminium 3.7 p.c., paper 1.9 p.c., textile machinery 12.7 p.c., machine tools 32.7 p.c. and ammonium sulphate 9.5 p.c.

A special feature of the foreign trade of India is the extremely small proportion of its *land frontier trade.* The present barriers against land trade are in the shape of mountains and deserts which cannot be easily crossed. The other difficulties are tariff barriers and exchange complications. With the growth of communications and better political relations this trade with China, Nepal, Bangladesh and Burma should develop further. The principal commodities that are imported by India are grains, jute, fruit, raw wool, living animals and raw silk. The exports are cotton goods, sugar, tobacco, leather, tea, silk goods, salt etc.

India's Trade Relation with Certain Important Countries

The United Kingdom. The most important feature of India's foreign trade with U.K. is the gradual decline both in exports and imports. In 1969-70, the value of U.K. in

India's exports and imports were Rs. 164 crores and Rs. 100 crores respectively.

The principal exports to the U.K. are tea, jute, hide and skins, oil-seeds, raw cotton, raw wool, metals and ores. On the import side, the chief articles are machinery and mill-works, iron and steel, chemicals, instruments, hard-ware, liquors, motor cars, rubber manufactures, paper and pasteboard, etc.

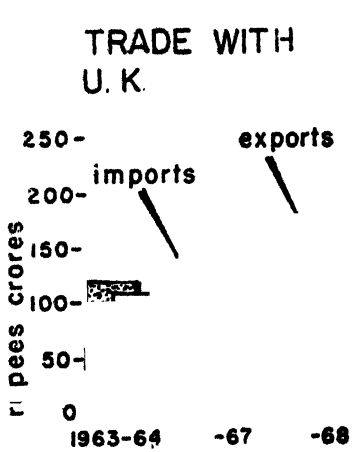


Fig. No. 57. Indo-British Trade

In accordance with the system of Commonwealth preference, the United Kingdom allows the unrestricted duty-free entry of almost all goods imported from India. Because of an acute shortage of foreign exchange, India controls nearly all imports by the import and Export (Control) Act, granting tariff preferences to some of the goods imported from the United Kingdom.

U.S.S.R. In recent years there has been a great increase in the volume of Indo-Soviet trade because of economic co-operation between the two countries.

The exports are tea, coffee, tobacco, textiles, footwears, cashew nuts, oilcakes, etc. The capital goods are the main imports. The present development of Indo-Soviet trade is the outcome of bila-

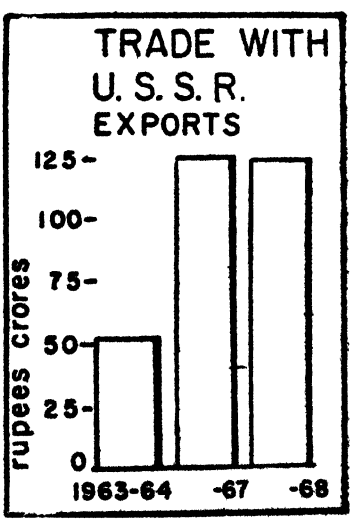


Fig. No. 58. Trade with U.S.S.R.

teral trade agreements for trade and payment between the two countries. The rupee-trade agreements between the two countries are characterised by the facts that they enable India to obtain from U.S.S.R., her requirements of machinery, equipment and other materials needed for her economic development through payment in Indian rupees. The range of Indian commodities which are exported to U.S.S.R. covers, besides traditional items, the products of new industries.

INDO-SOVIET TRADE (Rs. crores)

		Import	Export
1960-61	...	15.9	28.8
1964-65	...	78	82.4
1965-66	...	83	93
1967-68	...	96	122
1969-70	...	170	176

Burma. Imports from Burma consist largely of rice, beans and pulses, teak, rubber and precious stones. These represent more than 85 per cent of the total imports from Burma. More than 40 per cent of India's exports to Burma consist of cotton and jute manufactures. Other exports are iron and steel, tea, sugar, coffee, agricultural products, engineering and electrical goods, chemicals and pharmaceuticals, handicrafts, etc. The over-all trade with Burma is on the decline.

INDO-BURMA TRADE

(Rupees million)

	1960-61	1964-65	1965-66	1967-68	1969-70
Import	112	103	93	82	70
Export	52	63	35	38	71

Ceylon. The important items of imports into India from Ceylon are: copra, cocoanut oil and tobacco. Unhusked rice, cotton piece-goods, fish and coal are the important items of exports from India. Other important items of exports to Ceylon are pulses, fruits and vegetables, chillies, oil-cakes and manures.

A Trade Agreement between India and Ceylon was entered into in January, 1958 in accordance with which India would import specified quantities of Jaffna chewing tobacco at a concessional rate of import duty. On the other hand, Ceylon would provide facilities for the import of Indian tobacco for the production of cigarettes.

India has had a favourable balance for many years in her trade with Ceylon. In 1970, the value of goods exported was Rs. 25.6 crores and of imports Rs. 2.3 crores.

Japan. Commercial relations between India and Japan are regulated by an agreement of 1958. Imports into India from Japan are cotton manufactures, artificial silk and silk manufactures, iron and steel, machinery and mill-work, ships, railway shipment, industrial machinery, drugs and medicines, dyestuffs and newsprint. The principal items of India's exports to Japan are raw cotton, pig iron, manganese, mica, tobacco, sugar, hides and skins, coal and tanning materials. Raw cotton usually constitutes more than a quarter of Japan's total imports of foreign goods.

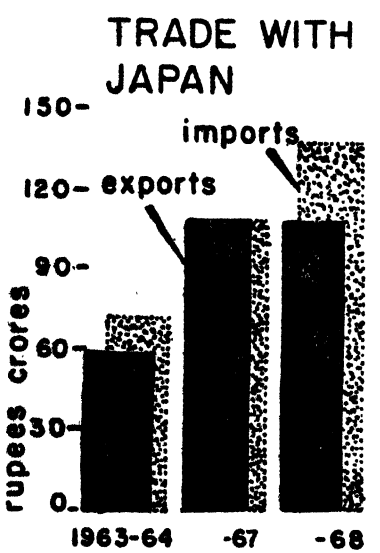


FIG. No. 59. Indo-Japan Trade

INDO-JAPAN TRADE

(In crore rupees)

	1964-65	1965-66	1967-68	1969-70
Import ...	79	107	106	69
Export ...	61	57	136	179

West Germany. Of European Common Market countries, West Germany is by far the most important customer of Indian goods. She absorbs about 40 per cent of India's total exports to E.C.M. The commodities are undressed goat and sheep skins, jute bags and jute fabrics, coffee, oil-cakes, tea, mica, seed lac and shellac, iron ore and concentrates, cashew kernel, manganese ore, spices, pepper and cardamoms, bones and raw wool. In normal times, imports from Germany into India consist of iron and steel, brass and copper, hardware, machinery and mill-works, glass and glass-ware, dyes, electrical instruments, liquor, scientific and surgical instruments.

In the case of India's foreign trade Western Germany has come to occupy the fifth place—behind U.S.A., U.K., U.S.S.R. and Japan. The balance of trade, however, has been continously against India during the last few years. It is because exports have either been stagnant or have shown a declining trend. In 1970. the value of exports to West Germany was Rs. 29.7 crores and of imports Rs. 83.7 crores.

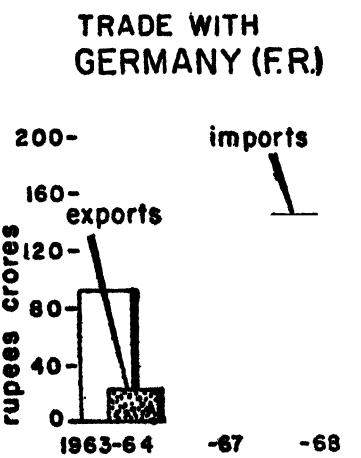


FIG. No. 60. Indo-German Trade

The most important item of import from West Germany is machinery and mill-work. The trade between the two countries is regulated by trade agreements under which both Governments facilitate the import and export of all commodities from either country.

United States of America. The principal items of exports from India to the U.S.A. are jute and jute goods, shellac and lac, cashew nuts, tea, hides and skins, carpet, wool, leather, undressed furs and mica. These and other traditional commodities constitute about 80 per cent of U.S. imports from India.

INDO-U.S.A. TRADE

(Rs. million)

Year	Import	Export
1960-61	3,275	1,025
1964-65	4,361	1,510
1965-66	5,234	1,470
1967-68	7,715	2,074
1969-70	4,960	2,380

U.S. imports of India's shrimps, leather goods, vegetable oils, coffee, rubber manufactures, cotton, woollen and silk manufactures, precious stones, brass and bronze articles, drugs and medicines, toys, books, art works and antiques, have increased appreciably in recent years. There is considerable interest in U.S.A. for India's new products like sewing machines, fans, castings, machine tools and even diesel engines as their production in U.S.A. involves higher cost in labour.

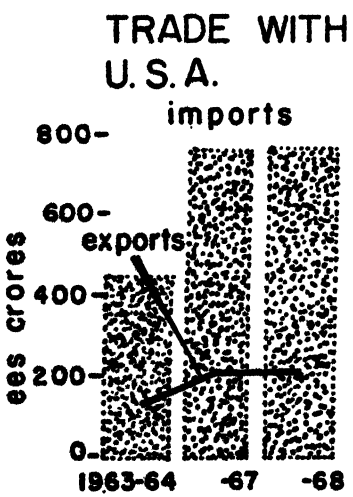


FIG. NO. 61. Indo-U.S.A. Trade

Over the years, the U.S.A. has emerged as the largest seller to India in view of India's imports of food grains and other items under aid and grant.

Other imports from U.S.A. are machinery, chemicals, textiles and metal manufactures.

Afro-Asian region. India's trade with the countries in the *Afro-Asian region* other than Japan, though individually small, is cumulatively sizeable. The percentage share of Asian countries are approximately 20 p.c. and of African countries 5 per cent for imports. Of the total value of India's exports, the off-take of the Afro-Asian countries amounts to about 25 per

cent. The shares of Asian and African countries are 20 per cent and 5 per cent respectively. The important countries are Sudan, U.A.R. and Kenya in Africa and Malaysia, Burma, Thailand and Indonesia in Asia.

India's Trade Agreements. India has concluded bilateral trade and payment agreements with several countries in forging closer economic ties and increasing the flow of trade in pattern and direction. The main objectives of the bilateral trade agreements are: (*i*) diversification of trade, (*ii*) establishment of direct relations with countries receiving Indian goods indirectly, (*iii*) promotion of trade with countries having controlled economy and (*iv*) operating a rupee payment account for meeting the exigencies of the foreign exchange situation. These agreements are of two kinds: (*a*) committing the parties to specific quantities of export, (*b*) provision regarding the procedure for payments. India has trade agreements with a number of countries of which important are Czechoslovakia, Finland, West Germany, Hungary, Pakistan, Poland, U.S.S.R., Yugoslavia, U.A.R., Viet-Nam and Burma.

India's trade with a number of newly independent African countries, such as Cameroons, Central African Republic, Chad, Dahomey, Gabon, Guinea, Ivory Coast, Mali, Niger, Senegal, Sierra Leone, Somalia, Togo and Upper Volta is small. Among the Asian countries the volume of our trade is low with countries like Cambodia, North and South Korea, Laos, Mongolia, North Viet-Nam and Yemen. India has been making efforts to develop her external trade with all countries of the world including the newly emergent countries. Already she has concluded trade agreements with several countries in the region, including Afghanistan, Burma, Ceylon, Iran, Iraq, Japan, Jordan, Morocco, Nepal, North Korea, Tunisia, Arab Republic of Egypt and North Viet-Nam.

India has also a large Entrepot Trade. The entrepot trade of a country consists of the re-export of articles previously imported. In other words, a country which imports things with a view to exporting them is known to have entrepot trade. India occupies a very favourable geographical situation for the purpose of doing entrepot trade as she is at the centre of the Eastern Hemisphere.

From the West, cotton, chemicals, machinery, minerals and metals are imported for distribution to countries like Kenya, East Africa, Malaya, Indonesia and Viet-Nam.

There is a large volume of *coastal trade* in India, The ports along the Indian coast are located in West Bengal, Orissa, Tamil Nadu, Kerala, Maharashtra and Gujarat which handle trade for their respective States as well as other States of India. In the coastal trade, the share of foreign merchandise is hardly 10 p.c. of the total. The *minor ports* of India play a vital part in the coastal trade of India.

Inter-regional Trade. Because of the vastness of the country, its varied climate and diverse natural resources, India has a gigantic volume of *inter-regional trade,* where, in addition to railways and motor vechiles, bullock carts and country boats share a large percentage of traffic.

The following commodities are important in the inland trade: Coal and coke, raw cotton, cotton piecegoods, rice, wheat, raw jute, iron and steel products, oilseeds, salt and sugar.

The value of inland trade has not been properly estimated although one can easily place it above Rs. 12,000 crores. The factors which govern the value of total trade between regions depend on the composition of their respective resources and the distance.

QUESTIONS

1. Point out the chief features of the foreign trade of Britain after 1948. Name her four most important commodities of import and export trade, and the reasons for their emphasis.

2. Give your reasons for the leadership of world commerce with the U.S.A. after the Second World War.

3. Account for the expanding foreign trade of Japan since 1957. How do you explain the changes in the direction of her foreign trade in recent years ?

4. Analyse the factors that have helped West Germany to develop her foreign trade since 1950.

5. How do you account for a small share in world commerce by U.S.S.R. ?

7. Write short note on the principal exports of the U.S.A. (Indian Institute of Bankers, 1968).

8. Why does trade take place between different countries ? Explain. (B. Com. Delhi, 1971)

9. What do you mean by a common market ? Explain the purposes for which the European Common Market was set up. Has it promoted international trade ? (Delhi, B.Com., 1971)

PART TWO

REGIONAL ECONOMIC GEOGRAPHY

CHAPTER X

EUROPE

Europe is a very small continent and has a total area of 3,760,000 square miles. Asia is five times as large as Europe. The countries of Europe can be divided into three groups: (*i*) highly advanced, comprising U.S.S.R., West Germany, U.K., Belgium, Sweden, Norway, Switzerland, France, the Netherlands and Denmark ; (*ii*) fairly advanced, such as Austria, Finland, Poland, Czechoslovakia, Italy, Hungary and Yugoslavia ; and (*iii*) less developed, like Greece, Portugal, Spain, Albania, Bulgaria and Rumania. There is no underdeveloped country in Europe.

Causes of Europe's Greatness

Europe as a continent is a highly civilised region in the world. Its manufacture and commerce have reached the greatest development yet known. Certain geographical factors have mainly contributed to its greatness.

The location of Europe has contributed to a great extent towards the industrial and commercial greatness of the continent. Europe is accessible to other continents by land or seas. It is separated from Africa by the narrow strait at Gibraltar and from Asia by the straits of Dardanelles and Bosphorus. "The two great continents have served as an outlet for European energy by providing territory for colonial expansion, a market for European products and a source of raw materials and food." Even with regard to America, the continent is admirably located for commerce.

Europe has a longer sea-coast than any other continent in proportion to its area. The Baltic, the Mediterranean and the

Black Sea have deeply penetrated into the continent and thereby made ocean-transport the most economical form of bulk conveyance. The situation of Europe in higher latitudes has made the climate neither very hot nor very cold. With the exception of the Tundra and Taiga, every part of Europe is habitable. The climate helps the rapid progress of its people.

Her natural resources are vast and varied. More than 31 per cent of the total area of Europe is forested. The principal forest-belt stretches from Scandinavia to the Urals. The forest resources of this belt are best exploited in Sweden, Finland and U.S.S.R. The second important belt extends from the highlands of Southern Germany to Yugoslavia. Europe does not export timber in considerable quantities, because the local demand for it is always great. In the world production of round wood, Europe contributes approximately 20 per cent.

Nearly one-half of the mineral wealth of the world is raised in Europe. Coal-fields are found in Great Britain, France, Belgium, South Holland, Germany, Southern Russia and North Spain. Europe produces about 50 per cent of the world's coal. Most of the coal of Europe is of anthracite or good bituminous type. As the coal-fields are mostly located near the seaside or the river-valleys, the cost of transportation is not high.

Europe is also the leading producer of iron-ore. The important iron-ore regions are Spain, Eastern France, Northern Sweden, Southern Sweden, and Russia. Europe raises 34 per cent iron ore of the world's total. There are large petroleum-deposits in the Caucasus, the Urals and Rumania. Europe raises about 3 per cent oil of the world's total. Lead, zinc, platinum, copper, potash and aluminium ore are also found in large quantities.

MINING AND QUARRYING IN EUROPE, 1969

(in million tons)

	World	Europe
Coal	2,064	511
Lignite	765	580
Iron ore	390	60
Crude Petroleum ...	2,072	37
Antimony	53	4
Mercury	9	5

The agricultural lands of Europe are its greatest resources. It exceeds all other continents in the production of wheat, oats, barley, rye and flax.

The Mediterranean region, the lowlands of North-Western and Central Europe and the eastern lowlands are the agricultural regions. Farming is highly intensive and the methods of cultivation are scientific. Yields per acre are also high in the case of all crops except maize. Europe produces, normally, about 30 per cent of the world's wheat. Wheat is cultivated in a wide belt extending from the Danube basin to the southern Urals. The continent produces, on the average, 30 per cent oats and 50 per cent rye of the world's supply. In the production of potatoes, sugar beet and barley she surpasses all other continents combined.

PRODUCTION OF AGRICULTURE, FORESTRY AND FISHING, IN 1969[1]

(In million tons)

	World	Europe
Barley	113	48
Oats	55	18
Sugar beet	235	184
Rye	31	16
Wheat	318	71
Round Wood ...	2,182	316
Fish catches	63	11

Europe is the greatest manufacturing region of the world. The conditions for the development of manufacturing industries were present as early as the 18th century and as a result, the industrial revolution came in Europe first. The conditions were that the large population had a high standard of living to provide a potential market ; that the people had high degree of technical skill which they acquired from their experience in household industries ; that the people had inventive capacities which led them to the use of machines and mechanical power ;

[1] The sources are Production Year Book 1970, F.A.O. United Nations, 1971 ; Statistical Year Book 1970 of United Nations 1971.

and that the continent had large reserves of coal. Today, the heavy and basic industries of Europe are confined to the coal-fields. The major areas are in a continuous belt that extends east and west through the middle portion of the continent and includes Great Britain, Northern France, Belgium, Western Germany, Czechoslovakia, Southern Poland and Central Russia. In the manufacture of chemicals, cement, textile fibres and iron goods, Europe's position is uncontestable. She is surpassed only by the U.S.A. in the production of automobiles, electrical equipment and metal wares. Europe is a great consumer of petroleum, and the leading consumers are U.K., West Germany, France and Italy, which depend entirely on imported oil.

With regard to world trade, the share of Europe is more than 50 p.c. In 1969 the value of world trade was $285,000 million imports and $273,000 million exports of which Europe enjoyed $156,000 million and $146,000 million respectively.

She has developed her means of communication and transport remarkably. The merchant marine of Europe represents more than 68 per cent of the world's tonnage. Europe has more than 230,400 miles of railways. It has approximately 4.8 miles per 10,000 inhabitants, and 2.3 miles of railroads for 40 sq. miles. Of the world's railway traffic, Europe's share is a little more than 50 p.c. In airways, however, the supremacy goes to U.S.A. Europe maintains regular air services with Asia, Africa and Australia.

On the basis of 1969 estimates, Europe has the highest density of population in the world with 92 persons per sq. km. as compared to 69 in Asia, 10 in America, 11 in Africa and 2 in Australia. U.S.S.R. with 242 million people has 11 persons per sq. km. The distribution of population is very uneven. The Western Europe has 148, Southern Europe 95, Eastern Europe 102 and Northern Europe 49 persons per sq. km. The mountain regions of Iceland, the highlands of Scotland, the largest Scandinavian mountains, the Norrland of Sweden, the north-eastern part of Finland, the boreal forest and Tundra along the shores of the Arctic Ocean are almost uninhabited. Heavy densities with more than 260 people per square mile are found in the Ukraine, Moravia, Silesia, Bohemia, Saxony, Westphalia, the Rhineland, Southern Holland, Belgium, Northern France and England.

Some Deficiencies of Europe

She is deficient in strategic minerals like petroleum, lead, tin, and manganese, and the seriousness of the deficiencies is critical in view of the fact that she consumes about 50 p.c. of the total production of these minerals. Coal is practically absent in Norway, Sweden and Finland. She is totally dependent for cotton, jute and rubber on the tropical countries even though her manufactures from these products have world wide demand. The manufacturing areas are most unevenly distributed with little development in Spain, Portugal, Albania and Bulgaria. Also, all her industrial countries are large importers of food.

Mention may be made of two organisations in Europe which have been playing a great role in the economies of many countries. *These are the European Economic Community (known also as Common Market) and the European Free Trade Association.* E.E.C. consists of Belgium, France, West Germany, Italy, Luxemburg and the Netherlands, aims at creating a single economic unit, free from internal barrier and provides a single market for all goods with a single common external tariff. In January 1972, Britain, Ireland, Denmark and Norway have decided to join the common Market from 1973. EFTA with Austria, Denmark, Norway, Portugal, Sweden, Switzerland and U.K. aims at promoting, by abolishing customs tariffs, economic expansion, the national use of resources, and fair competition for the harmonious development of World trade. The EFTA countries are more dependent on foreign trade in relation to their population. While E.E.C. is a homogeneous geographical area, the EFTA is not.

Union of Soviet Socialist Republics

The Union of Soviet Socialist Republics, sometimes called the Soviet Union, Soviet Russia or Russia, occupies the eastern part of Europe, the northern half of Asia, the western part of Central Asia, and a part of West Asia. The country covers about one-sixth of the earth's land surface, excluding Antarctica. The greatest distance from north to south is about 4500 km. and from west to east about 10,000 km. As a political unit, it is the largest in the world. It is bounded on the north by

the Arctic Ocean and on the west by Rumania, Poland, the Baltic Sea and Finland. The east is bounded by the Pacific Ocean. Numerous mountains, plateaus, deserts and semi-deserts, inland seas, etc., form the southern boundary of the State. The country covers an area of 22 million sq. km.

Geographical and Political Features. The coast-line is regular and extremely short in comparison with the size of the country. The northern shores are frozen during winter as they are in the Arctic circle. The Pacific coast also remains closed to navigation during winter. Murmansk is the only ice-free port throughout the length of the northern coast-line. As the port is situated on the extreme north-west it receives the warming influence of the North Atlantic Drift.

Because of its geographical location in the northern part of the Eurasian continent, the climate of the country, generally speaking, is very severe. As there are no mountains in the north with east-west direction, the cold air masses from the Arctic blow unobstructed towards the south. On the other hand, the high mountains and plateaus of the south running from east to west prevent the warm air masses of the Indian Ocean from reaching the Russian plains. Throughout the country, winters are excessively cold except in the extreme south. Rainfall and temperature are not much influenced by the bordering seas. Rainfall is maximum during summer. The climate of the country is influenced by the following factors: (*a*) the direct contacts of its territory with the Arctic Ocean ; (*b*) great distance of Central Asia from the sea ; (*c*) the presence of a warm Atlantic current in the north-west ; and (*d*) the vast land mass between the Pacific and the Atlantic Ocean.

The U.S.S.R. is a federation of fifteen Union Republics.[3] There are Autonomous Soviet Socialist Republics, Autonomous Regions and National Districts in certain Union Republics.

The population of Russia has always grown rapidly. From 74 million population in 1858, the figure rose to 178 million in 1912. In 1970 the population was estimated at 243 million, which is about 9 per cent of the world's total population.

[3] These 15 Republics are R.S.F.S.R., Ukraine S.S.R., Byelorussian S.S.R., Uzbek S.S.R., Kazakh S.S.R., Georgian S.S.R., Azerbeijan S.S.R., Lithuanian S.S.R., Moldavian S.S.R., Kirghiz S.S.R., Tadjikis S.S.R., Armenian S.S.R., Turkmen S.S.R. and Estonian S.S.R.

The greatest concentration of population is found in the Ukraine where more than 45 million inhabitants of Soviet Russia live in an area of 600,000 sq. km of land. The average density per square km in area in European Russia is 32 persons, and in Asiatic Russia, three persons. About 48 per cent of the population live on 6 per cent of territory while 65 per cent of the territory contains 6 per cent of the population. Although there are more than 150 towns with more than 100,000 population in each, the number of towns, each with a population of 1 million and above, is only 9. These towns are Moscow (6 m), Leningrad (4 m), Kiev (1 m), Baku (1 m), Gorky (1 m), Novoshibirsk (1 m), Tashkent (1 m) and Kharkov. The urban population increased from 29 million in 1913 to 135 million in 1970.

Economic Development through Series of Five-Year Plans

The Soviet Government has brought a new life to the country through a series of planning based on public ownership in industry, and on mixed public and collective ownership in agriculture. In 1928-29, the Government devised a five year economic programme not only to re-organise the agricultural economy but also the heavy industries. The plan achieved 94 p.c. of its targets by 1932. "The Second Five-year Plan" was formulated to run from 1932 to 1937 and worked so as to make the country industrially self-sufficient and to redistribute her industry in such a way as to locate her great industrial enterprises where power was available or where there was an abundant supply of raw material, and also, to utilise to the full the labour resources in the different parts of the country. The Plan also aimed at increasing the output and improving the quality of consumer goods. When this Plan period was over, the large scale industry exceeded by 4 p.c. but the target of the consumer goods was not reached. When the Second World War broke out the Union was working out the Third Five-Year Plan (1938-1942) in which provision was made for "(1) increased regional self-sufficiency, especially as regards food-stuffs, fertilizers, bricks, cement, etc., and (2) for a further shift of the industrial centre of gravity to the east." During the first three years, the industrial output increased according to plan targets, but thereafter the Plan was interrupted because of the attack

of U.S.S.R. by Germany. "The whole of the national economy was switched to help the war effort, and the whole industries were shifted from the western areas to the east.

The Fourth Five-Year Plan for 1946-50 was introduced with the main purpose of rehabilitating the war-ravaged regions of the country. Russian economy suffered the most grievous losses at the hands of the Germans in 1941-44. Russia lost half of her coal and steel capacity and two-thirds of her iron ore. Similarly the oil industry sustained substantial injury and the damage done to agriculture was considerable. Besides, 25 million people were rendered homeless due to destruction of dwelling houses by bombing. By making bold changes in the planning methods, the Soviet Union brought about the economic recovery within a few years. Industrial establishments in various basic industries which were previously controlled from the centre, have been transferred to the constituent Republics. In addition to the series of five year plans, a seven-year plan (1959-65) was initiated to increase the industrial output by 80 p.c. and agricultural output by 70 p.c. The country has already become a great industrial power in the world.

The main economic task during 1966-70 was to secure the rapid development of the country's economy, greater efficiency, higher labour productivity, increased growth of industry and agricultural stability. Under the development plan, power output was to reach 830,000-850,000 m.kwh, oil 345-355 million tons, machine tools 220,000-230,000 coal 665-675 million tons, steel 124-129 million tons, cement 100-105 million tons, sugar 9.8 to 10 million tons and mineral fertilizers 62 to 65 million tons.

The main task of the 1971-75 Five Year Plan is to secure a considerable rise in the living standard on the basis of high rates of growth in production, increase in its effectiveness, scientific and technical progress and accelerated growth of productivity of labour. By 1975, the national income is to increase by 37-40 p.c., industrial output by 42-46 p.c. and agricultural output by 20-22 p.c. There is a strong feeling in the country that for the improvement of the system of planning and economic management, the use of computers, the application of economic and mathematical methods as well as advanced means

of communication are required. The need for enlarging enterprises and merger of some factories and plants is appreciated in order to take all the benefits of new technology and new managerial conditions.

State Farming and Collectivisation. Farming activities in Russia are at present carried on under two methods—*Kolkhozes* (large-scale collective farms) and *Sovkhozes* (large-scale State farms). The collective farm is an agricultural enterprise formed by peasants on the principle of voluntary affiliation to run large-scale public economy on the basis of common, socialist ownership and collective labour. All property of a collective farm is the common property of the collective farm members. The land is placed at the disposal of the collective farms for perpetual use entirely free of charge. The collective farms themselves draw their production plans and determine crops and areas to be cultivated. A portion of their produce is sold to the State, and the remaining for distribution among the farmers. Some of it is also in the market. Though the major part of agriculture is carried out in collective farms, the State farms have played a key role in providing leadership in the development of Socialist agriculture.

The collective farms cultivate an average of 1881 hectares per farm. The State farms have at their disposal 58 million hectares of cultivable land. *At present the crop area occupies only 10 per cent of the total land area of Russia in spite of the great efforts by its people and their government.* The agricultural operations are highly mechanised. There are definite climatic limits to the extension of agriculture. Temperature conditions limit the spread of agricultural settlements Polewards, while in Central Asia want of rainfall is the main obstacle. More than one-fourth of the Soviet Union is entirely unsuited for agriculture because of climate, soil or relief. Another one-fourth of the area consists of soils which lie in the agricultural zone but are at present not suited for agriculture. Good agricultural land in Soviet Union covers approximately one million square miles and enables the country to be rated as a great agricultural region of the world. There is a wide variety of crops in the Soviet Union because of different climatic conditions and soils. The agricultural products have helped the country to develop an industrial economy.

The direct consumption of food-stuffs being high in the country, there is hardly any surplus for export. Another feature is that northern Russia is mainly a grain-consuming area and can satisfy only 1/6 of its demand by its own production of food.

Principal Agricultural Crops. *Wheat* is the principal grain crop of the U.S.S.R. In European Russia, wheat is not only cultivated in the rich black earth lands of the south but also in the more northerly latitudes by clearing the forest and adopting scientific methods. Wheat cultivation has increased rapidly in western Siberia as well. Orenburg region, Kazak and Karakhalpak are the other principal wheat-producing regions. In spite of the rapid extension of wheat cultivation in other areas, the Ukraine is still the leading wheat-producing region in Russia. Wheat production has increased from 32 million tons in 1952 to 80 million tons in 1969.

U.S.S.R. is an exporter of wheat although the quantity is on the decrease. From 5·6 million tons in 1960, it came down to 2·8 million tons of wheat which U.S.S.R. exported in 1967. Her exports are mainly to Eastern European countries. In order to send wheat to these countries, U.S.S.R. has also to import wheat.

Sugar beet is cultivated in the region between Kiev and Kursk, Transcaucasia, West Siberia and Lake Baikal region. Soviet Russia raises nearly one-fourth of the world production of sugar beet and occupies the first place in the list of producers. In 1967-68, beet sugar production in U.S.S.R. was about 8·7 million tons. The other crops are rye, barley, flax, tobacco and tea. Russia produces about 35 per cent of the world's output of rye. The areas for barley are the Ukraine, Steppe region and Siberia. Russia raises about one-fifth of the world's barley production. She also supplies half of the total world requirements of flax.

Cotton is the most important plant of the Russian staple industries. At present U.S.S.R. is able to meet all her home requirements and also to export cotton fibre. Cotton is cultivated (*a*) in the Crimea, (*b*) to the north of the Black Sea, (*c*) to the north and east of the sea of Azov, in Uzbekistan, Tajikistan, Turkmenia, Azerbaijan and the Southern areas of Kazakhstan. There are many research and educational insti

tutions which are engaged in evolving new varieties of cotton. Fine-quality cotton similar to Egyptian variety is being successfully cultivated in the southern cotton-producing districts.

The average yield of cotton per acre is higher than in U.S.A. In 1969, U.S.S.R. produced 2 million tons of cotton. *Tea* and *rice* are also being raised in considerable quantities. Though there were no tea plantations in 1931 in the country, its progress gave a production of 57,000 tons in 1967. Tea growing areas are Georgia, Krasnadar and Azerbaijan.

The agricultural industry of the Soviet Union is being developed in terms of the requirements of industry and the needs of the population. There is a single plan for the national economy. Soviet Union today occupies second place in the world for agricultural production. Wheat, rye, potatoes, sugar beet and flax fibre are each the largest in the world. One-third of the national income is derived from agriculture. About 27 million people are engaged in agriculture. This is because of the size of agricultural land, diverse soil and climate and of certain crops which do not permit mechanisation.

Afforestation is considered to be the only reliable method to check soil erosion. Huge forest shelter belts are being erected in several rows along the banks of the Volga, Ural, Don and Northern Donetz. There are belts (each 60/100 metres wide), totalling 5,320 km. in length, to act as a barrier against the hot, dry winds from Central Asia. The main wooded belt is from the Urals range to the Caspian Sea.

Mineral Products of U.S.S.R. The Union is very rich in minerals and undoubtedly stands first for the known reserves of many basic raw materials (iron and manganese ores, copper, coal, lead, zinc, wolfram, nickel, bauxite, mercury, mica, asbestos and potassium) and holds one of the first few places for the proved supplies of oil and gas. She made tremendous progress in geological survey as a result of which many mineral resources have been discovered in the different parts of the country. The places which were without mining are now important suppliers of various minerals in large quantities. And yet half of the territory of the country has been geologically surveyed. *She today is almost self-sufficient in all strategic minerals essential to modern economy.*

U.S.S.R. supplies more than one-fifth of the world production of coal and occupies the first place in the list of coal-producing countries. The output of coal including lignite in the country was estimated at 426 million tons in 1969 as against 209 million tons in 1948. The important coalfield is in the Donetz basin (often called Donbas) which lies to the north of the Black Sea and covers an area of 10,000 square miles. From 90 million tons of coal in 1950, the production in the Donbas region was more than 200 million tons in 1967. Before the Revolution of 1917 the Donetz coal-field alone supplied more than 90 per cent of the Russian output; today it supplies about 40 per cent. The second important coalfield is in the Kuznetsk region. The development of Kuznetsk coal-field has transformed this Steppe region into a great industrial centre. The production was about 120 million tons in 1967, most of which was used in the metallurgical works. The other principal coal-fields of the country are Tunguz (the Yenesei basin), Irkutsk, Pechora (in the Tundra region of the north of European Russia), Burein (in the Amur basin), Yukut (in the Lena basin), Kansk (brown coal), Karaganda (in the Steppe region of Asiatic Russia), Minusinsk, Moscow, Central Asia (South of Ferghana), Ural (near Sverdlovsk and Chelyabinsk), Far East (near Vladivostok), and Transcaucasus (near Batum). The Asiatic coal-fields of Kuzbuz, Minusinsk, Irkutsk, Burein and Vladivostok supply fuel to the Trans-Siberian Railway.

It is estimated that the coal reserves of the Soviet Union contain 57 p.c. of the world's reserves and are in excess of one and a half trillion tons distributed from Moscow to Kamchatka. About 90 per cent of these reserves lie in Asia.

In 1969, the Soviet Union was the second largest producer of crude petroleum in the world. Her production which was hardly 29 million tons in 1948 went up to 329 million tons in 1969. This was about one-seventh of the world production. The oil-producing regions are the Caucasus and Kubyshev, Bashkiria and Perm in Ural-Volga. Baku has always been an important producer of oil. The Volga-Ural fields were developed after 1928, and today the area is termed a "Second Baku". Oil is found on the western side of the Urals at Ukhta in the north; Chussov, to the east of Perm; Staerlita-

mak, to the east of Samara. A large new oil-fields has been discovered in the trans-Volga area of the Saratov region.

A number of pipe-lines move the oil to the industrial districts and the coast for export—(*i*) from Baku to Batum on

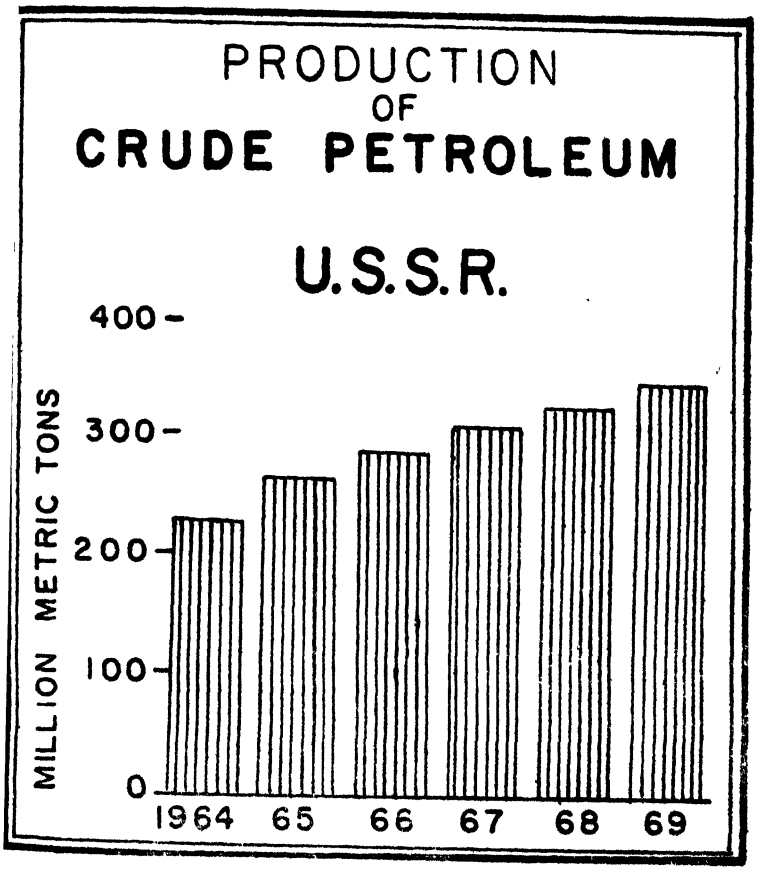


FIG. No. 62. Production of Crude Petroleum

the Black sea, (*ii*) from Grozny and Maikop to Tuapse on the Black Sea. The largest pipe-line in U.S.S.R. was completed in 1955 connecting Tuimazy in Bashkiria with Omsk. The petroleum reserves are estimated to be over six billion metric tons of which the Caucasus-Caspian contains 50 p.c.

Large oil deposits have also been found in Central Asia and Kazakhstan, in Krasnodar Territory and other areas. The Baku and Grozny fields, the old oil areas, which before the revolution accounted for 90 per cent of the country's oil production, have been found to contain considerably more oil. Today they account for only 28 per cent of country's output, even though they produced more than double the oil produced in the best pre-revolutionary years.

Considerable deposits of combustible gas have been discovered in the Ural-Volga oil-bearing region, Stavropol Territory, the Western Ukraine, the Eastern Trans-Ural, and other regions, and these discoveries have resulted in the rapid development of the gas industry in recent years.

In U.S.S.R., because of the long distances over which the fuel-materials are to be transported involving much carrying expenses, the present policy is to encourage the utilization of local fuel as much as possible, specially in the European belt. This has also resulted in the opening of a series of hydro-electric stations. The country has the largest dam in the world at Krasnoyarsk on the Yenisei which was opened in 1963 to provide hydro-electicity with 5 million kw capacity for aluminium plants nearby, some steel plants and chemical works. There is another dam on the Angara, a tributary of the Yenisei at Bratsk, which was the world's largest dam until the completion of Krasnoyarsk.

Soviet Union is one of the greatest iron producers and ranks first in the world since 1958. The country is supposed to contain 41 p.c. of the world's iron-ore reserves. Prospecting has multiplied the iron-ore resources in the old areas many times over, and has led to the discovery of many new deposits in Kazakhstan, Western and Eastern Siberia, Karela and the Far East.

The most important recent accomplishment is the discovery of immense deposits of rich iron-ore in Kustanai Region, Kazakhstan, and arrangements are being made for the production of 10 million tons of ore a year.

Large rich iron deposits have also been found in Belgorod Region, in the southern part of the U.S.S.R., where much prospecting is being done. Many of the deposits discovered

in the Ural, Yakutia and other areas are high-grade alloyed ores.[3]

The principal iron-ore regions at present are:—

(1) In the neighbourhood of Kursk;
(2) near Orsk in the Southern Urals;
(3) at Telbes in the Kuzbuz region;
(4) the Murmansk peninsula;
(5) the Magnet mountain near Magnitogorsk in the Urals;
(6) at Krivoi Rog in the Ukraine.

In 1969 Soviet Russia produced about 240 million tons of iron-ore including lignite. The reserves of iron-ore have been estimated at nearly 10 billion tons.

Soviet Union is the leading manganese producer in the world. In European Russia, manganese is raised in two principal localities: (*a*) near Chiatura in the Caucasus of Georgia, supplying most of the ore for export; (*b*) near Nikopol in Southern Ukraine, about 100 miles north-west of Crimea, supplying most of the ore for domestic consumption. Further east, there are other deposits of manganese at Orenburg in the middle Volga, at Bashkiria in the southern Urals and on the Muzul river in Siberia. The production of manganese ore in 1969 was about 48 per cent of the world's total. *Copper* is found in Kazakhstan, and the leading mine is at Kounrad, near the north shore of Lake Balkhash. The annual production of copper ore is about 900,000 tons. The main centre of the *atomic* industry is at Ust-Kamenogorsk in the Altai mountains. Uranium deposits are being worked near south-east Tashkent, near Lake Baikal, in Southern Armenia and Adizhan. About one-sixth of the world production of bauxite is raised in U.S.S.R. She is the third largest producer of molybdenum ore in the world, although the production is one-sixth of that of U.S.A. With only one-third of the production of Canada, she is also the second largest producer of nickel ore. In antimony ore, too, she occupies the fourth position after China (Mainland), South Africa and Bolivia. Soviet Union is one of the leading producers of platinum, the production of which is

[3] The Soviet geologists claim that U.S.S.R. contains 55 p.c. of the world's iron ore.

more than 180,000 troy ounces. Platinum is raised mostly near Nizhni Tagil in the Urals. Gold deposits are found in the Urals, the Lena Basin and the Lake Baikal region. The Union produces about 10 million fine ounces of gold. Chromium deposits are found in the Urals, Orenburg, Bashkirian and Kasaksky.

Forests and Fisheries

Soviet Union contains more than one third of the total forest land of the world. Within the country, the total area covered by forest is 33 p.c. of the territory. There are vast resources of pine, fir, larch and spruce which are used for timber, paper-making and the manufacture of cellulose. Of the whole forest land of the U.S.S.R., a large portion is administered and worked by the State and the balance is in the hands of the peasantry. There are, however, enormous difficulties in the adequate utilization of forest resources. *The uneven geographical distribution of forests, the inadequately developed transport system, remoteness from the centres of domestic and foreign consumption and the shortage of labour are the main handicaps in Soviet Russia.* The forest lands of the Union are mostly in Asiatic Russia.[4] Most of the forest lands of European Russia are in the north although the Caucasus contains an inexhaustible supply of many valuable varieties of timber. The northern region of European Russia and Siberia together contribute 55 p.c. of the country's total timber. At present Caucasus supplies only 2 p.c. of the total timber. The total production of round wood in U.S.S.R., in 1969 was 385 million cubic metres.

In fishing industry, the country has made astonishingly rapid development from virtually nothing 15 years ago to become one of the world's largest.

The Russians have far outstripped many countries in technical know-how when it comes to large scale fish harvesting. The fishing operations are highly efficient and the Russians tend to combine their fishing with oceanographic research. The

[4] However, owing to the absence of proper transportation facilities by roads and rivers, the exploitation of forest resources is difficult in Asiatic Russia.

fishing is confined mainly to the northern part of the Pacific ocean.

The total fish catches in 1969 were about 6 million tons as against 1·9 in 1948. The production has maintained a steady rate of increase. In 1970-71, U.S.S.R. caught 6,583 whales out of the world's total of about 41,735.

Manufactures and the Industrial Zones

Within recent years Soviet Russia has made considerable progress in the manufacturing industries. U.S.S.R. produced about 20 per cent of the world's total volume of industrial output in 1967 compared with 10 p.c. in 1947. Within the country, the current volume is forty-five times more than what it was in 1913. The average annual rate of industrial growth since 1960 has been 11·1 p.c. Today, the country takes the first place in Europe and the second place in the world (after the U.S.A.) in regard to industrial output. The methods of production are highly advanced, and the factories are well-equipped with modern appliances. It is the aim of the Soviet organisation to effect a widespread redistribution of industries throughout the country, so that no particular area can have industrial monopoly. The principal manufactures are machinery, farm implements, motor tractors, motor cars, textiles, leather, pottery, chemicals, refining of sugar, etc. The Soviet industrial organisation thus tries to be dependent on those raw materials which are found only in the country. For many years, the Soviet Government did not emphasise the importance of consumer goods. It is only recently that the country has encouraged production of shoes, clothing, washing machines and other consumer goods. This is being done because of the growing income of Soviet consumers and the Government's desire to satisfy their demands. *There are six chief industrial regions in the Soviet Union.* Historically the important industrial area is the *Moscow-Gorki-Tula region.* Ninety per cent of the cotton manufactures are concentrated in the *Moscow region.* Moscow and Ivanove are the two important cotton centres. Metal industries are localized at Tula, Moscow and Gorki. The Moscow area is also responsible for 60 per cent of the Union's chemical industries. The great

handicap of this industrial region is the paucity and poor quality of natural resources.

The most important industrial region is the *Ukraine and its margins.* The Donetz basin of the Ukraine supplies about 55 per cent of the Soviet steel and 70 per cent of the aluminium. The Donetz basin is also important for sugar mills, flour mills and leather factories. The industrial centres are Kiev (grain market), Odessa (agricultural machinery), Krivoi Rog (iron and steel), Dnepropetrovsk (general engineering and thermal power station), Rostov (agricultural machinery, Voroshilovgrad (locomotives), and Stalingrad (iron and steel works). Because of its resources and communication facilities, this area is likely to remain the top industrial region of the U.S.S.R.

The *Ural-Karaganda industrial area* is comparatively new. This area includes Perm, Sverdlovsk, Chelyabinsk, Orenburg, Karaganda, Magnitogorsk and Nizhni Tagil. The area produces about 20 per cent of the pig iron and 25 per cent of the steel produced in the U.S.S.R. The other industries are chemicals, railway workshops and armament foundries. The area is served by the Trans-Siberian and the Caspian Railways.

The *Kuzbuz,* also called the *Kuznetz,* region in western Siberia has, of late, become an industrial area of great importance. The important industrial towns are Kemerovo (oil refining and metal works), Stalinsk (iron and steel works, locomotives), and Tomsk (aeroplanes).

Within recent years, *Soviet Central Asia* near the border of Afghanistan has developed cotton industry, chemicals and iron and steel industries. Tashkent, Bukhara and Stalinabad are the chief towns of Soviet Central Asia.

The Far Eastern Region has recently assumed great importance. As the area is more than 2,000 miles from the Urals, the Soviet Government has been trying to make it economically self-sufficient. Yarkutsk, Vitim, Komsomolsk, Orlovok and Vladivostok are the chief towns of the Far Eastern Area.

The special feature of Russia's economy has been the emphasis it has always placed on the development of heavy industry, though the production of consumers' goods has also increased. The preponderance of machine building has ensured economic self-sufficiency. The primary aims in the sphere of industry are to expand the iron and steel, non-ferrous

metals, fuel and chemical industries and to ensure such a rate of construction of power station that will keep power supply ahead of demand.

New industrial enterprises that went into production in 1966 included oil refineries at Kirish and Kremenchug, chemical works at Uvarovo, cement works in Kemerovo region, the Baikal cement works, steel rolling mills at the West Siberian, Krivoi Rog, and Kommunarsk metallurgical works.

Of late considerable progress has taken place also in the expansion of light industry in the country. Already, there has been emphasis from heavy industry to light industry and consumer goods like cotton and woollen textiles, leather foot wear, paper, sugar and rayon.

In the production of pig iron and steel, Russia has made tremendous progress in recent times. From about 18 million metric tons of pig iron in 1948, the production was a little less than 82 million tons in 1969.

Recently the Soviet-British joint Commission on scientific-technological, trade and economic cooperation placed considerable importance on the participation of British firms in building industrial enterprises in U.S.S.R. and of Soviet organisations in similar projects in Britain.

Transport : The means of communication in the U.S.S.R. are very important because of the vastness of the territory, immense but sparsely scattered population, the unequal distribution of natural resources, the location of industries and the concentration of grain production in the south of the country. The entire gamut of transportation types can be found within the U.S.S.R.

The U.S.S.R. has the largest river system in the world. The importance of the rivers of the U.S.S.R. is determined by the climate, the geological structure, topography and the size of the territory. Although the rivers are navigable and widely used for transport, these are either flowing to the land-locked seas or to the Arctic sea. The rivers freeze in winter and dry up in summer. The navigation in some cases is impeded by rapids. The early summers are usually the period of flood for the lands round the mouths of rivers flowing to the north, as the snow in the upper parts of such rivers melts first. However, the rivers are long, have a gentle fall and a slow

current which make navigation possible right up to their sources They also receive many tributaries and flow through agricultural lands. The Russian rivers are also utilized for the production of hydro-electric power.

The Soviet Union possesses some of the largest rivers in the world—the Lena 3800 kms, the Obi 3508 kms, the Yenesei 3360 kms, the Amur 4000 kms and the Volga 3500 kms. Altogether the Soviet Union has more than 180,000 miles of navigable rivers. The sources of most of the rivers are in the plains and are fed by rain, lake and the melting snow. In spring when the snow melts, the rivers spread out by several miles. The principal rivers of European Russia are Dvina, Dneiper, Don and Volga—the last-named being the greatest river, in the basin of which lies more than half of Russia. The Volga is the longest river in Europe and plays an important role in the economic life of the Soviet Union. It rises in the swamp country north of Moscow and flows into the Caspian Sea, after traversing about 3,400 kms. Gorki, Kazan, Kuibyshev, Saratov and Stalingrad are situated on the Volga. Oil and food move north along the river, while for south-bound traffic timber and manufactured goods are important. The Volga is linked with five seas by canals. The Volga-Don shipping canal was opened in 1952. The Don is not suitable for shipping, and so the Volga-Don Canal provides a deep water highway from Kalach to Rostov. The canal links the White, Baltic, Caspian, Azov and Black Seas into a single water transport system. The Obi, Yenesei, Lena and Amur are the principal rivers of Siberia. There is a project to utilise the Siberian rivers for agriculture by means of dams and canals. The Amu-Darya and the Syr-Darya are the principal rivers of Central Asia. They have their sources in mountains and are fed by the melting of snows. There is a plan to connect the Amu-Darya with the White Sea-Baltic Canal across the Caspian Sea. Russia's waterways handle about 10 per cent of the total goods traffic. These also provide enormous supplies of hydro-electric power. The U.S.S.R. rivers are also important for irrigation, although full use of them has not been made so far, specially in Central Asia and Trans-Caucasus.

Northern passage along the coasts of the Polar Sea is only navigable for a few months in the year, but it establishes direct

maritime communication between European Russia and the Far East through Murmansk, Leningrad and Vladivostok for the produce of the basins of Obi, Lena, Yenesei and Kolyma rivers. Lakes and sea also play an important part in the transport system. The Black Caspian and Aral seas and lakes like Ladoga, Onega and Baikal provide waterways for carrying goods and passengers.

Soviet Union has about 160,000 km of railways which serve both economic and strategical purposes. The country holds the first place in the world for passenger traffic and in the length of electrified lines. An extensive programme of electrification of railways is being carried out in the Urals, Siberia, Trans-Caucasia and the suburbs of Moscow, Leningrad and Tallinn. The railway network is dense in western U.S.S.R. In the Urals too, the network is heavy but elsewhere the rail lines are inadequate. Most of the lines are single track. Moscow, the focus of the system, is linked with the Urals, the Ukraine and other parts of industrial Russia to the north and south. About 80 p.c. of all goods traffic and 55 p.c. of passenger transport go by rail. In recent years there has been an enormous increase in the volume of railway traffic in the country. In 1956, a 15-year plan was adopted for the construction of electrified lines, new lines and second tracks. The central areas will be connected by electric lines with the Donetz basin, the Urals and Siberia, and ultimately with the Soviet Far East.

Russia has made very great progress in air-transport. The total length of internal airlines is nearly 435,000 km. All important Russian cities are linked by regular air services. There are three principal airways, all radiating from Moscow. The one goes to Vladivostok on the Pacific coast *via* Kazan, Sverdlovsk, Omsk, Irkutsk, Chita and Khabarovsk. The second line runs from Moscow to Stockholm *via* Riga. At Riga it is connected with the German airways. The third line goes to Kabul from Moscow *via* Orenburg and Tashkent. There are regular airlines between U.S.S.R. and China, Poland, Czechoslovakia, Hungary, Rumania, Bulgaria, Finland and India throughout the year. The Soviet airlines carried about 45 million passengers in 1967.

Trade. In spite of the tremendous progress in all areas of economic activities and in the trade with more than 100 countries, 70 of which are on the basis of trade agreements, the share of the country in the world's total trade is still very small. Till recently, the Soviet Union had trade relations mostly with Socialist countries both for export and import. At present great significance is attached to trade with the newly-free developing countries. The Soviet Union's trade with advanced developing countries is a recent phenomenon.

Although the excess of export over import is not considerable, U.S.S.R. has always maintained a favourable balance of trade. Of the total import, machinery and transport equipment account for 34 p.c. and other manufactures like consumer goods and textiles for 26 p.c. The principal export commodities are machinery, transport equipment, chemicals, metals, timber, foodstuffs and other manufactures. In 1967, manufactures accounted for three-fifths of total exports and two-thirds of total imports.

More than three-fifths of her exports go to West Europe, Czechoslovakia, Poland, Hungary, Rumania and Bulgaria. East Germany takes one-fifth of the total exports. The value of foreign trade in 1970 was £ 4854 million and £ 5292 million for imports and exports respectively.

India's share in the foreign trade of U.S.S.R. has not shown much progress. There is considerable scope for Indian goods like sugar, fruits, clothing, footwear, silk fabrics, tea and raw tobacco.

The Technical and Economic Cooperation Agreement with Iran is of great significance to the U.S.S.R. The agreement provides each country transit across the other's territory and has thus opened a new chapter in the history of U.S.S.R. for approach to South-East Asian market through Iran and Persian Gulf ports. The new overland route will save 30 days in transit and 50 p.c. in freight rates.

Moscow, the great industrial centre of Russia, is not only the capital but also the great nodal centre of Russian routes; from it railways diverge in different directions. Its manufactures are textile and metal goods, leather goods, paper, etc. The population is over four millions.

Leningrad, at the mouth of the Neva, is a great Baltic port. It is the natural outlet of Russia to western Europe. Ship-building is important, specially the construction of ice-breakers. Paper cellulose and aluminium are the manufactures. Its population is more than three millions.

Baku, on the Caspian Sea, is one of the most important oil-yielding centres in the world. Oil is carried for export by pipelines to Batum on the Black Sea. *Murmansk,* on the north shore of the Kola Peninsula, is the only ice-free port of the north. The port has railway connection with Leningrad. *Odessa,* on the north coast of the Black Sea, is the chief port of Southern Russia. The principal export is wheat. *Kiev,* on the Dneiper, is a grain market of considerable importance. It is one of the oldest cities in Europe. *Rostov,* on the Don, near the north-eastern coast of the Sea of Azov, is an industrial centre where agricultural machinery is made. *Kharkov,* the capital of the Ukraine, manufactures tractors, motor cars and agricultural machinery. *Dneipropetrovsk,* on the Dneiper, has important engineering works. A great dam has been constructon the Dneiper to supply hydro-electricity to the industries.

The United Kingdom of Great Britain and Northern Ireland[5]

Great Britain is a highly industrialised country in the world. The commercial and industrial development of Great Britain was remarkable from the latter half of the nineteenth century. She was the leader in engineering development, the pioneer in railways and the inventor of a great number of industrial processes. By 1900 Great Britain alone accounted for about one-fifth of the total world trade, while Great Britain and the Empire together accounted for nearly one-third. *She possesses certain advantages which have greatly contributed towards the remarkable growth of her commerce.*

Favourable Geographical environment: The climate of the British Isles, on the whole, is mild and equable. The mildness of winter causes little or no interruption to agriculture,

[5]The British Isles consist of Britain and Ireland and cover an area of 121,600 square miles. Great Britain (comprising England, Wales and Scotland) and Northern Ireland constitute the United Kingdom. U.K. has 94,000 square miles of area.

and its comparative freedom from heavy snow-fall causes little interruption of communication. "The climate is neither so hot nor so cold as to prevent people from working either in field or factory throughout the year. The British capacity for regular routine work, so necessary in the manufacturing industries, is partly the result of climate conditions."

The coast-line of Great Britain is broken up by numerous inlets, so that no part of the country is more than 100 km. from navigable water or more than 160 km. from the sea. The nearness of the coast, on both sides, places a manufacturing region within easy reach of many markets. The seas surrounding the British Isles are everywhere shallow—usually less than 300 feet, because the islands lie on the continental shelf. These shallow waters provide excellent fishing grounds as well as breeding grounds for the fish. The North Atlantic current spreads out over the shelf and its ameliorating effect on the air is thus magnified. The effect of tidal movement is increased by the shallowness of the water, which gives the benefit of high tides in flooding the harbours, keeping them free from silt and waste and bringing ships far up the estuaries.

The situation of the country is very important. The English Channel has separated the country from the Continent. The country is, on the other hand, very near to Europe for the purpose of commerce, and, on the other hand, it is quite distant from Europe from the point of view of invasion by any European power by land or sea, although it does not enjoy equal immunity from aerial attacks. The country is, moreover, situated in the centre of the "land hemisphere" which has enabled her to maintain commercial and cultural contacts with the advanced as well as densely populated countries. The great industrial countries of the Continent—Germany, France and Belgium—face her eastern and southern coasts while the U.S.A. can be easily approached by the Atlantic Ocean.

The country is very fortunate in having large deposits of coal and iron. Coal is of superior quality and is found close to iron-fields. All the principal industries of Great Britain are more or less localised near the coal-fields. Chalk, slate, tin and clay are also found in small quantities. The rivers of the United Kingdom are of little use for navigation; but their estuaries are always important for shipping.

Economic and Human Factors in U.K.'s Growth

The rapid commercial and industrial progress of U.K. is the result of certain forces. First, the essential political stability of the country's democratic parliamentary Government made industrial progress rapid. Secondly, the temperament, character and industry of her people are her strength. The industrial output per head of her population is one of the highest in the world. Great Britain is even today the traditional home of outstanding technical achievement. Because of the industrial skill of her people, she enjoys world-wide reputation in the matter of superiority of design in textiles, pottery, aero-engines and ships. The spirit of adventure is a feature of British character, which cumulatively led to the building up of the British empire.[6] Thirdly, internal communication is highly developed. Great Britain's railways serve all the great ports of the country. The road-system is also excellent, and motor transport handles both passenger and goods traffic. The inland waterways are, however, not very important, and they carry about 4 per cent of the traffic handled by the railways. Fourthly, the British Commonwealth of Nations contains more than 24 per cent of world population and it provides an excellent market for her goods as well as a source of her imports. Because of the political link with many of these countries in the past which were the British colonies or dependencies, the economic tie has remained strong even today. Fifthly, Britain's tradition of steamship, her skill in marine engineering and in the management of shipping have enabled her to provide the greatest contribution to international shipping. The British ships took the settlers to new countries, carried their exports and the imported goods they needed. Britain still has the largest merchant fleet in the world. Sixthly, English language has spread throughout the globe. English is the language in Canada, U.S.A. and the West Indies in North America, Australia and New Zealand in Oceania and South Africa. During the past century and a half, the British ruled large areas of Africa and Asia. In many of the new States in

[6] No single nation since the days of the Roman Empire had covered such a vast empire and carried so great a responsibility as did Great Britain till 1939.

these continents, English continues to be a *lingua franca,* for official and commercial purposes. The common language has greatly facilitated the growth of commercial relations with the United Kingdom.

Finally, the national character of the people in appreciating the values and cultures of other nations and yet maintaining their own characteristics has not perhaps brought about a unity of behaviour in line with other cultures, but her people because of their characteristics, always earned respect and understanding of the peoples of the Empire. Even today, British character has a special meaning to the commonwealth countries, and this has greatly facilitated the expansion of British markets. In addition to these contributory causes, the free trade policy that prevailed in the country in the last century and the great mechanical inventions are also to be taken into consideration.

She is however facing a number of problems, challenging her position in commerce and politics. The high tariff of other countries of the world is affecting the trade of the British Isles adversely to a great extent. Great Britain is not fortunate as the possessor of the essential raw materials of industry. She has no doubt the deposits of valuable coal and low-grade iron-ore, but these are no longer the only key materials of an industrial economy. Indeed, no other great industrial country has so few of the raw materials. Petroleum, manganese, tin, bauxite, lead, copper, cotton, rubber, jute and oilseeds must be imported. Secondly, the Commonwealth of Nations of which Britain is the head is becoming more and more a very loose and uncertain organisation in terms of economic strength to Britain. The dearness of land arising from the density of population and the great development of industry, high wages of the labourers and the deficiency of water-power are also giving anxiety to the British industrialists. Finally, the technological and human resources of the U.S.A., West Germany and Japan have made them very strong as competitors of U.K.

Population : The United Kingdom is a very densely populated country. The estimated total population of the United Kingdom in 1970 was 56 millions. It had increased by over 9 millions since 1944.

The average density of population in U.K. is 224 per quare km. *With the exception of Belgium, Netherlands and Vest Germany this is the highest density of population re-orded for any country in Europe.*

Northern England and South Wales are the centres of the ensest population, because these are the industrial areas. Re-ently population in Southern England, particularly in the uburbs of London, has increased with great rapidity. Lanca-hire, Glamorgan, Warwickshire, Durham and Staffordshire ave more than 600 people per square km. The industrial ctivities of these regions attracted people from other parts of he country. The agricultural districts of Norfolk, Suffolk, incolnshire and Cambridge contain less than 500 people per quare mile. The mountainous districts are all sparsely popu-ated. The pressure of population has never been acute in ritain as it has colonies where her people can migrate for ettlement.

A fairly large number of people leave the country every ear to settle outside. There are both push and pull factors n this regard. The weather and overcrowding and the criti-al employment situation in U.K. are the three broad push actors. The employment opportunities, more money, better iving conditions and "wanting the British" attitude in Austra-ia and New Zealand are some of the pull factors. Moreover, ustralia, Canada and New Zealand, have people of Anglo-axon stock either in a majority or in a sizeable minority who ave common language and common institutions. Naturally, he British immigrants settle in these countries more easily han others who come from the continent of Europe.

Mining : The two most useful minerals—coal and iron—re found in close proximity. The British coal mining indus-ry has been in existence for over 300 years. Coal is found hroughout the country in large quantities ; in the annual pro-luction of coal Great Britain occupies the third place in the vorld being surpassed by U.S.A. and U.S.S.R. The British oal-beds are of the carboniferous age and contain coal of bitu-ninous quality. The value of several of the British coal-fields s enhanced by their closeness to the sea. Coal is the principal argo of the coastal trade and forms one-third of the total. The quality of British coal is fairly good. The workable coal

reserves are estimated at 100,000 million tons and should last 400 to 500 years at current rate of consumption.

Coal mining is very important in the national economy of the country as it supplies seven-eighths of the power required in industries. It employs nearly one million people, and about four millions of the population of the country are directly dependent on it. Coal mining accounts for 90 per cent of the value of the total mineral output of the country. Each major coalfield is an important industrial area. Coal is also important in British export trade accounting for over 5 per cent of the total value of the country's exports.

The principal coal-fields of the United Kingdom are the following:

(i) *The Pennine Range.*

Northumberland and Durham ; York, Derby and Nottingham ; South Lancashire ; and North Staffordshire.

(ii) *The Midland Plain.*

Warwickshire ; South Staffordshire ; Leicestershire.

(iii) *The Welsh Mountains.*

North Wales and South Wales.

(iv) *The Midland Valley of Scotland.*

Ayreshire and Clyde.

Small coalfields are also found in Bristol, Edinburgh and Kilkenny in Ireland.

PRODUCTION AND CONSUMPTION OF COAL

(In million tons)

	1958	1960	1967	1970
Coal output	215.8	193.6	175	153
Inland Consumption ...	202.7	196.7	170	140
Export & bunkers ...	4.9	5.5	2.4	3.5

Thus it will be observed that from 1956 onward there has been a gradual decline in the volume of internal consumption of coal in U.K. The pause in the expansion of industrial production, the growing competition from fuel oil and increasing efficiency in the use of coal are the factors that led to the decline.

Before the World War II, the production was so raised that about 20 p.c. of it was available for export. In 1939, U.K. ex-

ported 46 million tons of coal out of 228 million tons produced. It came down to 14 million tons in 1955, 4 million tons in 1958, and 3 million tons in 1969.

In 1970, the inland consumption of coal in U.K. was 140 million tons. The principal users were power station (78 m), domestic (21 m), coke ovens (25 m), gas works (6 m), cement (4 m), and chemicals (4 m).

Factors responsible for the decline of the coal exports : (*i*) The high price of British coal. As most of the easily accessible coal-fields have been mined, the workings have now followed the coal structures deep and far underground. The organised coal mining industry has been in existence for over 300 years. Naturally many of the best seams of coal are now worked out. Every coal mine has become deeper with thinner seams which demands a high level of investment. *Thus the cost of production has gone up.* Because of the ease with which coal is mined, the U.S.A. is putting cheaper coal in the markets. (*ii*) The rapid development of hydro-electricity. France, Italy, Sweden and other former customers have developed hydro-electric power. (*iii*) The discoveries of new fields. Australia and Natal —once large importers—have discovered many new coal-fields. (*iv*) Despite the rise in coal production, a higher output has increased the coal consumption in Britain.

The York, Derby and Nottingham coal-field is about 62 km long and 30 km wide. This area is responsible for more than 40 p.c. of the country's output of coal. This coal-field is within easy reach of the iron deposits. Nearness to sea has helped the growth of export trade. Scandinavia, Denmark and the Baltic States import coal from this area. The woollen industries of the West Riding and the iron and steel industries Sheffield are particularly associated with this coal-field. The cotton industry is primarily important in the South Lancashire coal-field.

The Midland coal-field came into prominence because of the iron and steel industry. The fortune of the industry in the area is therefore associated with the steel industry whose progress or decline has impact on coal output. Normally, these fields ontribute 11 per cent of the U.K.'s total coal.

The Ayreshire coal-field of Scotland raises coal mostly for export. The Clyde estuary does not actually possess coal, but it can very conveniently use the Lanarkshire coal. The great ship-building industry of the Clyde basin is based on the Lanarkshire coal and iron. The area raises about 14 p.c. of U.K. coal. *The South Wales coal-field* is known for the quality of its coal. It is particularly important for steamships and for export. This area contributes about 16 p.c. of the total output of the country.

In July 1946, **the Coal Industry Nationalisation Act** was passed to bring the coal mining industry into public ownership and control. On the 1st January 1947, the coal mining industry and certain associated activities passed into the control of *National Coal Board* whose duty it is to secure the efficient development of the coal-mining industry and to make supplies of coal available in quantities and at prices which seem best calculated to further the public interest. The National Coal Board has brought about reorganisation and development of collieries and also more mechanisation in cutting, loading and handling. As a measure to meet the problem of falling demand for coal, the Board has schemes for reducing open-cast production and closing uneconomic pits. The number of National Coal Board mines in 1967 producing coal was 438.

Great Britain is the birthplace of the modern iron industry. Her deposits of iron ore which are quite considerable are, however, of low grade. In 1970, she raised 12 million tons of iron ore. The principal iron-ore centres are (*a*) in the Cleveland Hills; (*b*) at Scunthorpe and Fordingham in Lincolnshire (*c*) at Corby and Kettering in Northamptonshire ; and (*d*) near Banbury in North Oxfordshire. The supplies of South Wales iron ore have been nearly exhausted and the iron and steel industry of this area now depends on Spain and France for iron ore. The most important iron ore field lies in South-East England. The iron fields of the U.K. can meet only 50 p.c. of her requirements of the metal industry. Many of the mines which yielded very rich ores are almost exhausted, and the easily accessible types or ores require a considerable outlay to provide fuel for smelting. Therefore, Britain finds it economical to import rich ores from Sweden, Spain, France, Brazil, North Africa, and Newfoundland. This imported ore is normally

haematite. She imports about 18 million tons of iron ore every year. In 1967, it was 16 million tons.

The other minerals found in the country are lead, zinc, copper and tin. Limestone, chalk, granite, slates and salt are also quarried. Quarrying is an important occupation in Cornwall, Devon, Somerset, Wales and the Cambrian peninsula. At one time tin was the most important mineral of England; now it is almost exhausted. Although the country is totally deficient in manganese, chrome ore, petroleum, tungsten, aluminium, nickel and copper, their supplies into the country do not entail difficulties in view of their availability in the Commonwealth countries. So long her ties with Commonwealth countries remain strong, her deficiency in respect of many minerals will not affect her economy.

Agriculture : The British Isles is a great manufacturing country, yet the farming activities of its people occupy an important place in the national economy. About 4 per cent of the total population are engaged in agricultural occupations. There are a little more than half a million agricultural holdings of varying sizes. About 50 p.c. of the total holdings are under 16 hectares in size, 18 p.c. are over 38 hectares and 30 p.c. over 100 hectares. Thus U.K. has the largest area of agricultural land per worker of any European country. The proportion of labour force, however, in agriculture is lower than in any other country. The causes of the drift from the land are the low wages and general working conditions.

Soil and climatic conditions determine the variation in the types of farming. *Arable farming* is confined to the eastern half of England, while the western half of England is known for dairy farming. Wheat, barley, oats, sugar beet and fruits are cultivated in those parts where climatic conditions are suitable. In Eastern England the geographical conditions are exceptionally favourable to the growth of such produce. Summers are hot, and, therefore, wheat is cultivated in Lincoln, Norfolk, Suffolk, Essex and Bedfordshire. Barley requires conditions similar to those for wheat, so it is also cultivated in the eastern plains. Oats are raised in the eastern plains of Scotland and in the lowland areas of Northern Ireland. Sugar beet is cultivated in (*i*) the wheat lands of Eastern England, (*ii*) North

Shropshire and the neighbouring countries, (*iii*) Fifeshire, and, (*iv*) the valley of the river Barrow in south-east Ireland.

The yields of agricultural crops per hectare compare very favourably with those having the highest yield in the world.

YIELD IN TERMS OF 100 KG PER HECTARE, 1968

	U.K.	World average
Wheat	43	18
Rye	29	14
Barley	38	18
Oats	34	16
Sugar beet	375	295

For nearly a century, she has been far and away the greatest importer of food in the world. The post-war world food shortage however has made it necessary for U.K. to maintain a high level of production of grains and other crops for home consumption. About half the food that Britain consumes today is home-grown compared with about one-third before the war. This increase in output has become possible through better management of land, improved techniques and the application of greater scientific knowledge and research. There has been great progress in mchanisation. Britain has the great tractor density—1 tractor to 38½ acres—in the world.

Livestock : Cattle are reared in every part of the United Kingdom and, in 1969, its number was 12 millions. They are mostly domesticated for their milk, meat and hides. The dairy industry is important in the following regions:

(*i*) Cornwall, Devon and Somerset: Cheese and cream are made here.

(*ii*) Welsh lowlands : Milk and cheese are produced for the dense population of the South-Wales coal-field.

(*iii*) *Cheshire* : It is the most important dairying area in England. Cheese and milk are important produces.

(*iv*) The vales of Oxford and Aylesbury. Milk is sent to London from here.

(*v*) Ireland is particularly noted for dairying which is carried on in the plains of the south-west and in the north.

Beef, veal, mutton and pork are the livestock production.

At one time England was a great sheep-rearing country and the prosperity of the country depended on the animal industry. But today this industry is neglected and is carried on in those parts where either agriculture is unsuitable or population is sparse. Even then, the U.K. contains more sheep than New Zealand. In 1969, the number of sheep was 29 millions. The principal sheep-rearing areas are the following: —

(1) The Pennines ; (2) the Welsh mountains ; (3) highlands of Scotland ; (4) Ireland.

U.K. has always been noted for the export of pedigree livestock, in particular the beef cattle.

The Fishing Industry :[7] The fishing industry is one of the greatest of the British industries. The shallow waters of the continental shelf are the feeding grounds of a great variety of fish ; so the fishing industry has prospered. The sources of fish in U.K. are (*a*) the distant waters of Iceland, Greenland, the north coast of Norway and the Barents Sea ; (*b*) the middle water grounds around the Faroe Islands and (*c*) the near water grounds in the North Sea, the Irish Sea and the coastal areas around Britain. The chief means of catching sea-fish are by the use of nets—trawl, seine, drift and ring—and by lining. Haddock, herring, cod and mackerel are the principal catches of the North Sea, and the ports engaged in this industry are Wick, Aberdeen, Peterhead, Stonehaven, Hull, Grimsby and Yarmouth. In the English Channel, near Cornwall, pilchard is caught.

Grimsby, on the Humber, has a world-wide reputation for the extent and value of its fisheries in northern waters, Iceland, Faroes and the North Sea. The neighbouring Humber port of Hull concentrates on the distant water fisheries. Hull normally produces the biggest aggregate catch of fish in Britain, mainly cod and haddock. Aberdeen is the third British port. Fleetwood in Lancashire owes its importance to its unique position in relation to the western fishing grounds, and it is also near big industrial and coal-producing areas. A major part of its

[7] Britain's fishing industry falls into two main divisions :
(*a*) Demersal fish which live on or near the sea-bed, e.g. cod, haddock, turbot, etc. ; (*b*) pelagic fish which live in the intermediate waters or near the surface, e.g. herring, mackerel etc. All fishing grounds—other than British coastal waters are regarded as high seas, and therefore open to ships of any nation.

catch is hake, but cod and haddock also form a large proportion nowadays.

The production of fish has remained more or less the same over the last decade. In 1955, it was a little above 1 million tons, and in 1970, it was a little less. Grimsby and Billingsgate (in London) are the two great fish markets of Great Britain.

The rivers of Great Britain supply salmon, trout and eels. In Scotland and Northern Ireland, fixed nets are used along the coast, and sweep nets in the rivers and estuaries.

The British fishing fleet is home-based. The trawlers steam out from ports for North Atlantic for ten days or so and then return unlike Japanese whose fleet stay away from home for a year and freeze the catches. The British fishing industry never has cared to seize the opportunity for world-wide fishing presented by the existence of the Commonwealth. But Japan uses local facilities or helps the local fishing industry in Tanzania, Ghana and India. The best known fish development project in India is receiving Norwegian assistance.

Manufacturing Industries and Industrial Regions

The United Kingdom's manufacturing industries provide a wide range of products many of which play a major role in world trade. Her industries are mainly concerned with production of iron and steel goods, textiles and chemicals. From the point of view of production and export, metals and metal products are the most important, followed by textiles and chemicals.

The British manufacturing industries are mostly on or near the coal-fields. Of late, other areas have developed industries with the use of electric power. The post-war industries include the production of agricultural machinery and oil refineries.

One of the most serious problems of British manufacturing industries is the competition from other countries in the world markets. There is no unit of industry in U.K. today whose exports can account for more than 29 p.c. of its total products. *The devaluation of sterling in November 1967* was brought about to act as a stimulant on industry mainly through increased export opportunities in the short run, and in the longer run through increased import substitution and industrial investment.

The devaluation has reduced British costs in export markets by 14 p.c. But the export industry has lost the benefit of export rebate upto 3 p.c. Also, there has been a rise upto 17 p.c. in the cost of imported raw materials.

Cotton Mill Industry

The cotton industry has been localised mainly in Lancashire ıd the adjoining areas. 85 per cent of the workers engaged in ıe cotton industry are to be)und in Lancashire, heshire, and Derbyshire. lost of the remainder are ı the West Riding and Scotınd.

The localisation of this ndustry in Lancashire)llows mainly from geoaphical causes. The spining of cotton demands a ıoist climate, otherwise the ıread breaks. The moist esterlies give Lancashire ıe necessary degree of huıidity for spinning. Secondy, Lancashire faces merican ports, thus ıcilitating the import of raw)tton. Thirdly, the presence of coal, limestone and water-ower was important in the early 19th century, when the factory :age of industrial development was on its way. Fourthly, ıe existence of a first class port in Liverpool is another great dvantage. The inherent skill of generations of operatives, the umber of inventions of machinery for cotton manufactures in ancashire, and the foresight and initiative of those citizens ho carried out the scheme of the Manchester ship canal are ıe other vital factors which contributed to the growth of the)uth Lancashire cotton industry. The production of woven oth in 1969 was 723 million yards.



FIG. NO. 63. The cotton manufacturing towns of South Lancashire

Lancashire towns may be divided into two classes according to their activities. Towns on the northern side (Preston, Blackburn and Burnley) are engaged in weaving. The southern towns specialise in spinning. Rochdale, Oldham, Bolton and Bury are the spinning towns around Manchester. The Lancashire industry depends mainly on its export trade, 80 per cent of the produce being exported.

There are also some noted centres in Scotland, among which Glasgow and Paisley are important. Paisley has specialised in the manufacture of thread. Glasgow had all the natural advantages of Lancashire, but the progress of iron and steel industries caused industrial development to move along other lines.

Great Britain cannot produce raw cotton. She brings this raw material from (*i*) U.S.A., (*ii*) India, (*iii*) U.A.R., (*iv*) Peru, (*v*) the Sudan and (*vi*) Brazil. Lancashire is specializing more and more in the production of fine quality cotton goods. The U.S.A. supplies about 40 p.c. of her raw cotton requirements, followed by Brazil, 25 p.c.

The principal customers of British cotton goods are Australia the Union of South Africa and West Africa. Great Britain also imports considerable quantities of cotton goods from Japan France, Germany and Switzerland.

Present Position

Lancashire had virtual control over the world cotton market till 1921. Since then she has fallen from that enviable position. Competition of Japan, India and the U.S.A. has taken much of her Eastern markets. Besides, many countries of Asia which previously used to import Lancashire cotton piece-goods, have set up their own textile industry and imposed import restrictions. Japan manufactures cotton goods at a price far cheaper than what is done by Lancashire. Cheap and efficient labour, nearness to vast markets in south-east Asia and tariff policy are the advantageous factors on the side of Japan. The intensity of competition in bringing the decline of British cotton exports can be realised from the fact that her exports came down to about 500 million square yards in 1967 from 4,000 million sq. yards in 1930.

A vigorous drive for quality and efficiency has been pressed ɔrward by the industry with support and assistance from the ɔvernment. Both in the production of high-quality cloth and in :aper varieties she has lost much ground in competition with ıdia, Japan, France, Italy and U.S.A. It is extremely doubtful ihe will ever be able to regain the trade she has lost, and ıat is more, she may not be able to keep all the trade that she ill holds. The future of Lancashire will depend to a great .ent on the ability to retain a share of the trade in high-quality ɔtton provided she can maintain a reasonable price level. The .roduction of new finishes for cotton goods with drip-dry, ɛase resisting and other properties have helped to widen the ırkets of the industry in recent times. However, the full vantage of the improvements in the textile industry can come ut if prices of raw cotton imported remain reasonable. In ct, fluctuations in raw cotton prices are causing great anxieties British cotton textile industry.

Man-made fibres like rayon, nylon, terylene, fibrolene and urtelle are being manufactured extensively. Often these man-ade fibres are being blended with cotton to produce fabrics d garments with moisture absorbent, hard wearing, drip-dry d crease-resisting properties. Midlands, Lancashire, South ales and Yorkshire are the areas of production. The produc-n of man-made fibre in 1969 was 1221 million lbs.

Iron and Steel Industries. Great Britain has long been a jor producer of iron and steel. The application of coal to the elting of iron ore was pioneered by Britain from the seven-nth century onward. By the second half of the nineteenth ıtury she made great expansion in steel production.

IRON AND STEEL PRODUCTION IN U.K.

(In million tons)

	Pig iron	Crude Steel	Home consumption
1963 ...	... 15	23	19
1964 ...	... 17	25.8	23
1965 ...	... 17	27	23
1969 ...	... 16	26	21
1970 ...	... 17	28	24

The existence of local coal and iron in close proximity mostly accounts for the growth of iron and steel centres in the country. By an Act in 1953, an Iron and Steel Board has been set up to exercise a general supervision over the iron and steel industry with a view to promoting an efficient, economic and adequate supply of iron and steel products under competitive conditions. The Board has power to fix maximum prices for British steel products. Closely allied to steel production are mechanical and electrical engineering. Machine tools, textile machinery, locomotives, agricultural machinery and office equipment are the chief products of mechanical engineering in U.K. The total value of these five products is enough to pay for all the imported metal ore. Equally powerful is the existence of electrical engi-

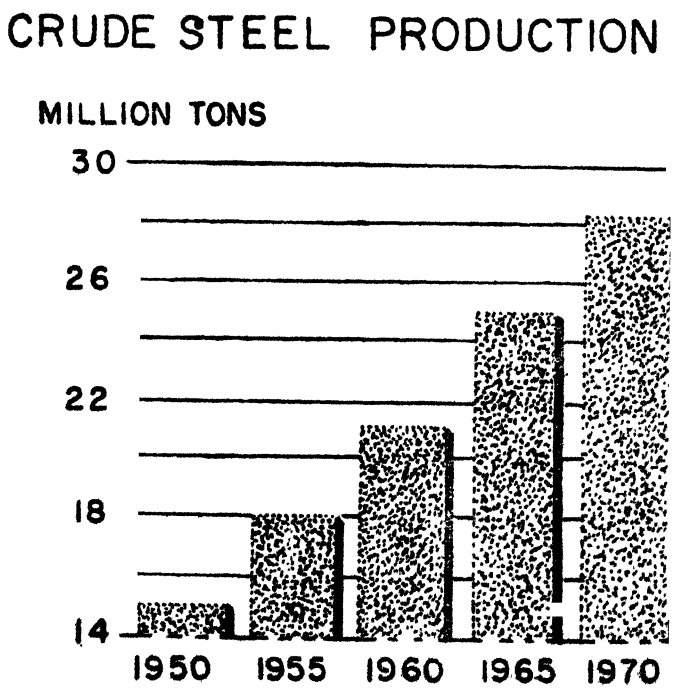


Fig. No. 64. Crude Steel Production

ring. The electric telegraph, submarine telegraphy, the tele-ne, use of electricity for lighting, production of heavy elec-al engineering equipment for generating plant and industrial poses, electronics (radio, television and radar) and the king of electrical appliances like irons, heaters and washing chines—all have made electrical engineering a very powerful ustry in U.K. There are five important steel areas in the ited Kingdom.

The Producing Regions

The Black Country has become the chief iron and steel-ducing area of Britain. The important centres are Birmin-m, Coventry, Dudley and Redditch, each of which has deve-ed specialisation; e.g., *Birmingham* in the production of tors, cycles, railway equipment, machine tools, electrical paratus and brassware; *Coventry* in cars and cycles; *Redditch* needles; and *Dudley* in chains.

In North-east Coast—The Tyne, Wear and Tees region—e-side is the chief iron-smelting centre. Other towns are rtlepool, Middlesborough and Darlington. In Newcastle ps of modern design are built. Cargo boats are built at derland. Swansea and Llanelly are the two chief iron and centres in South Wales.

The British steel industry uses about 50 p.c. of the iron ore abroad. Since the world production of iron ore has not wn any decline, and since its prices have not fluctuated much, recent devaluation should give an advantage to the exporters steel. U.K. exports finished steel products to the extent of ut 3.5 m tons annually.

The British steel industry is divided into private sector public sector. The British Steel Corporation which re-sents the public sector accounts for over 90 p.c. of U.K.'s put of crude steel.

The automobile industry of U.K. witnessed tremendous ress in recent years. In 1970, U.K. manufactured 1.6 million and 455,000 commercial vehicles as against the total vehicles alf a million in 1948. The industry is highly concentrated he West Midlands (Coventry and Birmingham), Greater don, Bedfordshire, Oxfordshire and Northamptonshire area Lancashire.

U.K. is a large exporter of motor vehicles in the world. The chief markets are the U.S.A., Canada and Australia. "An interesting point about the export of vehicles is the degree to which assembly is now being carried out in the countries to which they are sent." In the matter of sports car, the U.K. is the leading exporter in the world. The British sports cars are very popular both in Europe and the U.S.A.

Ship-building is one of the principal industries of the United Kingdom. For centuries, Britain has been one of the most important ship-builders of the world. The geographical position of the ship-building industry in any country is determined by two main requirements. These are: (*a*) a navigable river with easy access to the sea for launching purposes ; (*b*) easily available supplies of the main building materials. If there is any change in the principle of building material, the geographical location of the industry may also change. This has, in fact, happened in Britain in the last century and a half. In the early days of ship-building, vessels were made of wood. The ship-building was carried on in those estuaries and harbours where local supplies of wood were available or where conditions were present for importing timber. One of the chief centres was the Thames. The change from wood to iron as the material for ship-building in the middle of the nineteenth century shifted the industry to centres close to iron and steel production. The reasons for the growth and success of the industry in Britain are the following:

(*a*) deep tidal estuaries permitting a river to have easy access to the sea for launching;
(*b*) coal-fields, with steel industries near the estuaries
(*c*) the increasing demand for ships.

The ship-building industry of the United Kingdom is now concentrated in five principal regions:

(*a*) The North-East coast (rivers Tyne, Wear and Tees)
(*b*) the Clyde in Scotland
(*c*) Belfast in Northern Ireland
(*d*) Birkenhead on the north-west of England
(*e*) Barrow-in-Furness.

Till 1958, fifty per cent the world's new tonnage was launched by Britain. Since then, the proportion has come down though

he total output from the British shipyards has been the same. n 1969, the new tonnage launched accounted for hardly 12 p.c. of the world's total. Also, Japan has now taken the first place with about 35 p.c. of the world total.

London was the chief centre of the ship-building industry before the advent of iron. The building of ships on the Thames has become uneconomic because of the high cost of bringing fuel and steel from the distant centres of production. This industry on the Thames died out slowly and the last big vessel was built in 1911. But London has an extensive ship-repairing industry.

The shipbuilding industry is an outstanding example of surplus capacity. Because of higher prices as compared to Japanese ships, the British ships have less demand in the world market Devaluation has brought down shipyard prices of Britain almost equal to those of Japan. Full benefit from devaluation, however, is not being felt on account of higher steel prices.

The Woollen Industry : Prior to Industrial Revolution, Britain had a number of wool making centres throughout the country. With Industrial Revolution, most centres disappeared except Yorkshire which succeeded in retaining and further strengthening its position because of the local supplies of coal and iron ore and least resistance from weavers and spinners against mechanisation in the woollen industry.

The main sources of supply are Australia and South Africa for fine grade wools for worsted suitings, and New Zealand and South America for cross-bred, used mostly in woollen cloth, tweeds and carpets. The raw material element in a piece of cloth ranges from 35 to 40 p.c. of the total cost. The wool industry exports between 25 and 30 p.c. of the total output. devaluation of 1967 should increase the export.

There are four woollen manufacturing areas in Britain with leadership by Yorkshire. These are the West Riding of Yorkshire, the west of England, the Tweed valleys in Scotland and Leicester. The U.K. production of woven woollen fabrics is about 250 million square metres.

The Leather Industry of Great Britain is the third largest leather industry in the world. The industry is marked by a very high degree of specialisation. Its standards of quality are

exact and are accepted throughout the world. U.K. is the world's leading exporter of leather and leather goods. About 8 to 10 million lamb-skins, a much smaller number of calf-skins, some two and a quarter million cattle hides and a few horse and bull hides are normally available each year from domestic stock. About one-third of the total raw material needed is thus obtained. The rest is imported. India is the largest single supplier of goat-skins. The leather centres are London, Bristol, Liverpool and Glasgow. The British leather industry engages about 183,000 workers. The chief centre of heavy leather in England is in the South Lancashire district which extends from Liverpool to beyond Manchester. There are also heavy leather centres in Yorkshire, Essex, Kent and Surrey. Light leather centres are widely distributed. Britain is the world's largest maker of both leather and leather footwear.

Other industries include aircraft manufacture, electrical and mechanical engineering, chemicals, glasswares, silk, jute and artificial silk. Great Britain is an important manufacturer of heavy chemicals as she has an abundant supply of chemical salt. Chemicals and glasswares are manufactured in South Lancashire and Cheshire where salt deposits are available. Midland towns are important for leather industries. Jute is manufactured at Dundee.

Transport. Great Britain has one of the most intensive *railway systems* in the world. The main line system has been geographically divided into six main regions: (*i*) London Midland Region, (*ii*) Western Region, (*iii*) Southern Region, (*iv*) Eastern Region, (*v*) North Eastern Region and (*vi*) Scottish Region. The railway system is owned and managed by a public authority known as the British Railways Board. In 1967, total railway traffic amounted to 201 million tons, comprising coal and coke 122 million tons and iron and steel 36 million tons. Most rail road traction is by steam locomotives, but diesel and die-electric are increasingly used for shunting purposes. Electricity is also used for passenger traffic, particularly in the Southern Region, and a new electric system for all classes of traffic was opened across the Pennines in 1952.[8] In 1968, about 13,200 route miles were open to traffic.

[8] Of late, the British railways have been adversely affected by the competition of airways. Passenger traffic between London and Scotland

No country has a greater km. of *roads* than U.K. in proportion to size. There are over 3 km of public highway for every two square km of territory, making a total of 260,000 km of road. "If there are more roads in Britain than in any other area of comparable size, there is also a greater density of motor per mile than in any other."

The main *inland waterway* routes in England and Wales stretch from the major estuaries of the Humber, Mersey, Thames and Severn and converge on the Midlands, which are served by a network of canals. There are also important routes between the Humber, the Trent and the Mersey. The chief canals are Lancashire Canal, Leeds and Liverpool Canal, Manchester Ship Canal, Lee Navigation, Trent Navigation and Sheffield and South Yorkshire Canal. In Scotland, the most notable canal is the Caledonian, joining Inverness in the north-east with Fort William in the west. There are approximately 2,500 miles of navigable canals and locked river navigations in Great Britain.

Civil aviation in U.K. is run as a nationalised service. There are 100 aerodromes in U.K. under civil control. The main airports are London, Prestwick, Belfast, Birmingham, Liverpool, Manchester, and Glasgow. The London airport (about 14 miles west of London) has been developed as an international civil air-port.

In 1969, the U.K. airways had 256 million km flown, 15,358 million passenger km, 524 million cargo tons km and 82 million mail ton km.

The air services are operated by two Corporations—British Overseas Airways Corporation and the British European Airways Corporation. The *B.O.A.C.* (with British South American Airways now merged into BOAC) operates the (*i*) North and South Atlantic, (*ii*) West, East and South Africa, (*iii*) Middle East, Pakistan, India, Ceylon and Burma, (*iv*) the Far East and Australia. B.E.A.C. covers the Continent of Europe and the Mediterranean. It also operates internal services within the U.K.

Foreign Trade and Commerce of Great Britain: The location of the British Isles in the angle formed by the coasts of

is already shared by the airways to the extent of 50 per cent. Also, airfares are very competitive. Unless railways are sure of retaining a certain minimum percentage of traffic, further modernisations are not likely to take place.

Spain and France and of the low countries, Germany and Scandinavia, gives her a nodal point for trade and communication between Western Europe and the Mediterranean countries, Africa, Asia and America. British overseas markets and sources of supply are world-wide. Britain has a little under 10 p.c. of the industrial capacity of the western world. She controls, however, about 19 p.c. of the international trade in manufactured goods. At present the United Kingdom ranks second to the U.S.A. in total value of world trade. Her trade is all sea-borne. The predominance of imports over exports is the most peculiar feature of British Commerce. Great Britain is a great leading country. She gives services in banking, insurance, shipping and investments. These are generally known as "invisible exports". When one takes into account the figure of earnings from these invisible exports, one will find that Britain has undoubtedly a favourable balance of trade. The two aspects of her export trade are—(1) the exportation of the products of British industries and (2) the re-exportation of imported goods in substantially unchanged forms. The first includes the products of British soil, mines, forests, fisheries and factories ; the second includes such commodities as rubber, tea, wool and vegetable oil.

Volume of Export

(In £ million)

	British Produce	Exports of foreign produce	Total
1960 ...	... 3,554	141	3,659
1962 ...	... 3,791	157	3,948
1967 ...	... 5,025	184	5,210
1969 ...	... 7,039	295	8,315
1970 ...	... —	—	9,051

Value of Imports and Exports

(1 million U.S. Dollars)

	Total Imports	Total Exports
1962 ...	12,516	10,933
1965 ...	16,619	13,328
1968 ...	18,409	14,838
1969 ...	19,336	16,890

For imports and exports, the commodities are classified as (*i*) food and live animals, (*ii*) crude materials inedible except fuel, (*iii*) mineral fuels, lubricants and related materials, (*iv*) animal and vegetable oils and fats, (*v*) chemicals, (*vi*) manufactured goods classified chiefly by material, (*vii*) machinery and transport equipment, and (*viii*) miscellaneous manufactured articles.

PATTERN OF BRITISH SALES

(Million $)

	1961	1966	1968	1969
U.S.A. ...	930	1,750	2,100	2,080
South Africa ...	955	550	630	690
Asia ...	1,680	1,780	1,750	1,990
Canada ...	62	600	620	720
West Europe ...	3,860	5,820	6,070	7,240

The manufactured goods and machinery and transport accounted for three-fifths of the total exports in 1967. The important articles are textiles, iron and steel and machinery.

The Important Commercial and Industrial Centres and Ports

There are over 300 ports in U.K. of which 10 ports handle more than 60 p.c. of the foreign and coastal trade of the country. These ports are London, Southampton, Liverpool, Tyne ports, Glasgow, Belfast, Hull, Swansea, Bristol and Middlesborough.

London is situated on both banks of the river Thames, at the head of its ocean navigation. London is the capital of the United Kingdom and the largest city in the world; it is also the world's greatest sea-port and financial centre. The imports of London are much greater than the exports, because it is the distributing centre for the whole Kingdom. Tea and other products from the East and wool from Australian colonies find their chief European market in London. The port of London handles more tonnage annually than any other port in the world except New York. *Birmingham* is the commericial and industrial centre of the Midlands. It specialises

more particularly in small metal goods of all kinds—steel pens, swords, guns, brass-work, and the standardised parts of bicycles and motor cars. *Liverpool* is the most important port on the west coast of Great Britain. The imports are chiefly raw materials and food-stuffs from the U.S.A. Canada, South America, West Africa and West Indies (especially cotton, grain, oils, paint, animal products, tobacco, etc.). The principal exports are manufactured goods of cotton, wool, iron and chemicals. *Manchester* is the chief centre of the cotton textile industry of Lancashire and is known throughout the world as the cotton metropolis. *Sheffield* is the chief centre of the heavy steel and cutlery trade. *Leeds* is the centre of a great trade in ready-made clothing, leather and machinery. It commands the largest share of the leather and machinery. It commands the largest share of the leather trade of the United Kingdom and has important soap works and oil refineries. *Bristol,* near the estuary of the Severn, is a very old port. It carries on a considerable trade with America, particularly in the import of tobacco. It has also a large coastal trade. *Hull,* situated on the Humber estuary, has a busy continental trade especially with Hamburg and Bremen. *Bradford,* in the West Riding of Yorks, has become the chief centre of the worsted manufactures. Silk, velvet and dye are other products of this place. *Southampton,* on the south coast of England, at the head of a deep land-locked inlet, is noted as a terminus for American steamship lines. It owes its importance to its double tides and easy access from London. *Sunderland,* at the mouth of the Wear, is the most important ship-building centre in England. It has glass-works, chemical factories and rope-works. *Cardiff,* the largest town in Wales, carries on an immense coal-trade, sending more coal to foreign countries than any other town. It has chemical industries, ship-building yards, iron foundries, etc.

Swansea, the second town of Wales, does a vast trade in the smelting of iron, copper, silver, zinc, tin and lead. Its rapidly increasing importance derives largely from the oil which it imports and exports for local refineries. The iron ores of northern Spain are received here ; the copper ores come from the Str. Settlements and Indonesia. *Glasgow,* on the river Clyde, is the largest city of Scotland. As a port on the western coast of Great Britain, it is favourably situated to receive raw

materials from America. Glasgow is the centre of one of the busiest industrial areas of the world. Its industries are based on ship-building and its dependent activities. Its also supplies many important markets of the world with steel goods. *Edinburg* is situated on the southern shore of the Firth of Forth in Scotland. It is an educational and distributing city. *Dundee,* the third city of Scotland, is the chief centre of the jute industry. It is also an important fish market. *Aberdeen* is the fourth city of Scotland. The industries and commerce of this port are in a flourishing condition. Woollen clothes and carpets, linen sheets, chemicals, machinery and canvas are the leading products. The largest comb factory in the world is established here. *Belfast* is the busiest city of Ireland. It produces linen goods and is a ship-building centre. *Dublin* is the capital of Eire, the Irish Repubic. The making of poplin, the manufacture of biscuits, dyeing, the brewing of beer and the distilling of whisky are the principal industries. *Limerich* has important manufactures of linen, spirits and liquors.

Germany

Politically, the country is divided into two separate political States—Federal Republic of Germany or West Germany and German Democratic Republic or East Germany. The Federal Republic has an area of 248,548 sq. km. with 60 million population as in December 1970. East Germany has 108,173 km. with 17 million population.

Germany as a country is characterised by variations in physical features. There are three major physical regions in Germany. The Lowlands are in the north. To the south of the Lowlands are the Central German uplands. In the Southern part of the country is the mountainous territory, which is a part of the Alpine division of Europe. The physical diversity of Germany from Lowlands to minor Alpine ranges has been of great significance to the country as this diversity means that there are different types of soil and different types of rocks with minerals. Yet, the physical features do not separate one region from another or stimulate regionalism.

Germany is a great industrial and commercial country. Many factors—physical and human—have contributed towards her progress. The physical factors are: (*i*) situation of the

country in the heart of the leading, industrial continent, (*ii*) mineral wealth like coal, iron, potash, zinc, (*iii*) fertility of land, (*iv*) perfect waterways, (*v*) invigorating climate, and (*vi*) forest resources. The industrial expansion in Germany really began after 1871, when the German people attained unification in the Empire and inaugurated a comprehensive, coordinated, national industrial policy. As a result of her victory in the Franco-German War, Germany acquired the provinces of Alsace and Lorraine. There was further impetus to industrial growth when Germany entered upon the role of a world power and developed foreign markets successfully. By 1914, Germany became a great industrial power, next to Britain. She, however, lost all her colonies as well as 28,000 square miles of her own area as a result of her defeat in the first World War in 1918. For some years, her position as an industrial country remained weak, but her productive forces including human materials with their bearing on knowledge, experience and technological skills made Germany again a great industrial and political power by 1938. Her defeat in the second World War in 1945 resulted in the division of the country, first into four zones, each under the administration of allied powers, and subsequently into West Germany and East Germany.

Federal Republic of Germany. In spite of the division of Germany into two separate states, certain factors worked in favour of rapid industrial recovery of the Federal Republic or West Germany. West Germany not only retained 60 p.c. of the country's former industrial capacity, it was also relieved of its responsibility towards East Germany—an area of weak economies. Many plants and factories were destroyed, no doubt, but it was revealed later that the number of factories she built during the war was much larger. Thirdly, destroyed plants gave West Germany an opportunity to replace them by modern equipment of unsurpassed efficiency. Finally, the heavy grants of foreign aid stimulated rapid economic reconstruction. Today, *West Germany* has become a great industrial power, exceeding the production level of combined Germany of 1938 in many directions. All these amply demonstrate the great strength and quality of human powers in West Germany.

There are also other reasons for West Germany's industrial leadership in Europe today. Workers' wages are not lower than

any other country in Europe, and the fringe benefits are definitely higher than in U.K. The working hours are lower in West Germany than in U.K. The taxes are also high. The causes are, therefore, elsewhere. German industry is turnover-conscious and in the main expansionist. German expansionism have given an attitude of global sales efforts. The lowering of the profit rate forces industry to rationalise and encourage productivity.

The total farmland in West Germany was 13 million hectares of which 8 million hectares were arable land in 1969. From the agricultural point of view, the country is a land of small estates and peasant proprietors in the west and south, and of large estates in the north. On the whole, the soils are poor. By the application of rotation of crops and fertilizers, the Germans have maintained a high level of productivity. Intensive cultivation is practised efficiently and the products are wheat, rye, oats, beet and potatoes. Normally, the Federal Republic raises three to four times more of each agricultural crop than the Democratic Republic.

Transport. The great industrial development has been made possible because of the excellent transportation system. Communication by land, water and air is well organised by careful co-ordination. The railway system of West Germany is one of the best in the world. The railways are nationalised. The topographical features and average altitude are such that it has been possible to extend the railways throughout the country. The Federal Republic has air services which operate internal, European and transcontinental routes including North America, South America, Near and Far East countries.

The plain of Germany has an efficient system of waterways. In no other region has the advance of trade and industry been affected more profoundly by the development of water transport than in Germany, both West and East. The Rhine, Elbe, Oder and Vistula together with their tributaries and canals are the basis of inland waterway transport in the two States of Germany. The rivers have been deepened and connected with one another by canals so that there can be a complete system of water communication over a large part of the two States. The Rhine is connected with the Weser to the east, with the Danube to the south and with the Meuse to the west. The Rhine is also connected with the French waterways through the Rhine-Rhone

and Rhine-Marne canals. There is no other river in the world which is more important than the Rhine as a waterway. The traffic on the Rhine is comparable to that on the great Lakes of North America. The Elbe flows through the most densely populated part of the country and is connected with the Baltic through the Kiel canal. The Oder flows through the agricultural districts and canals have been constructed to join the river with the Elbe. The total length of navigable river and canals in the two States is approximately 7,000 miles.

One of the most important waterways is the Midlands canal, connecting the Elbe with West Germany. The Danube is connected with the German canal system by the *Oder-Danube Canal.* The Oder-Vistula canal is being extended towards the east to connect it with the Dneister river so that ultimately there can be through inland water communication between East Germany and Russia. Central and Northern Germany will also be connected soon with the Danube by the *Elbe-Oder Canal* and the *Rhine-Maine-Danube Canal* respectively, now under construction.

Mining. West Germany has an important place among other nations in respect of soft coal, potash, graphite, hard coal, lead, zinc, iron ore and pyrites. Principal minerals raised in 1969 were coal (111 m tons), Lignite (107 m), iron ore (7 m), potash (20 m) and crude oil (8 m tons). Coal and iron-ore, while not located in quite such proximity as in England, are easily brought together. The chief coal-fields are those of the Ruhr, Westphalia, Saar, Upper Silesia, Lower Silesia, Zwickaw and Lugan (in Saxony). Iron deposits are found in the field of Westerwald in the Lahn-Dill region, Upper Hesse district and the Peine-Salzigtes district. Zinc and lead are obtained from Silesia and the Rhine coal-fields at Rachen. Salt is found abundantly in Saxony and has enabled Germany to improve her agricultural and chemical industry. West Germany raised 8 million tons of petroleum in 1967 from the Emsland area, on the Netherlands border, and in Lower Saxony. It is however difficult to predict a prosperous future for German oil in view of quick exhaustion of German oil-fields.

In spite of large production of minerals, West Germany remains strongly dependent on the world markets for her mineral raw material supply.

Manufactures and Industrial Areas : West Germany has had unparalleled economic growth since 1950. With the exception of the U.S.A. nowhere else in the world the industrial system is more technology-oriented as in West Germany. Another special feature in West German manufacture is the adoption of rationalisation. *Rationalisation* denotes those methods by which the cost of production is to be reduced. "It includes standardisation, simplification of varieties, waste reduction, scientific management, the replacement of hand labour by machinery and economy in selling."

The determination, hard work and faith with which the erman people worked after the War to regain economic ength have no parallel in the history of any nation except pan. In 1967, about 8.5 million workers were employed in e manufacturing industries of the Federal Republic.

West Germany leads Western Europe in steel production nd has now become the fourth largest steel making centre in e world, being preceded by U.S.A., U.S.S.R. and Japan.

The basis of the industrial strength of West Germany has lways been the manufacture of iron and steel. One great dvantage of the State in the matter of iron and steel production the abundance of coal near iron-deposits. Moreover, the erfect waterways of the country permit easy transport of goods. The basin of the Ruhr river is the principal iron and steel-producing region of Germany. This area supplies nearly 80 per cent f the total German coal output. Local iron ore is not enough to upport the industry, and, therefore, large supplies are brought rom Spain, Sweden and France. The great advantage of the Ruhr area is the presence of the Rhine which facilitates the imort of raw materials and export of finished products. This part f the region is level and has facilitated an elaborate construcion of roads, railways and canals to connect the area with ports. Today, the *Ruhr area is the greatest manufacturing region of Germany*. Essen, Bochum, Dortmund and Dusseldorf specialise heavy engineering and machinery. In 1969, West Germany produced 34 million tons pig-iron, 45 m tons steel ingots and 32 m tons finished steel.

West Germany is the fourth leading country in the ship-

building industry.[1] The ship-building areas in Germany are: (*a*) the Elbe estuary with Hamburg as the centre, (*b*) Lubeck Bay with Lubeck, and (*c*) the Weser estuary with Bremer-Haven and Bremen. In 1967, West Germany launched 1 million tonnage of merchant vessels out of world's total of 16 millions.

Electrical machinery is manufactured in Berlin and Magdeburg. West Germany has now become the third important centre in the world for motor vehicle manufacture. About 250,000 workers are employed in the industry.

In *chemical industry* the supremacy of Germany has been always indisputable. *The spread of scientific and technical education in Germany is a contributing factor in developing chemical industry.* The possession of potash salt gave additional impetus to this industry. The industry has developed in the Elbe and Ruhr basins because of the supplies of coal. Elsewhere the industry receives cheap hydro-electric power. In the Elbe basin, heavy chemicals are made in Strassfurt and Schoenbeck. The coal-tar chemicals are made in the Rhine basin with Essen, Frankfurt, Elberfeld and Ludwigsaften. Munich and Berghausen are noted for electro-chemical industry. In precision engineering and optical industry Federal Germany has become the leader in the world and supplies world markets with 30 per cent.

The German *textile industries* are concerned with the production of cotton, woollen and silk goods. Although cotton mills are scattered throughout the country, two areas are particularly important—the Ruhr coal-field and Saxony. Raw cotton is imported from the U.S.A., Brazil and Egypt. The chief cotton-manufacturing centre is Munchen-Gladbach.

The *woollen industry* is very widely distributed in Germany and the chief centres are on the coal-field. Aachen, Chemnitz and Bremen are the woollen centres. The German silk industry is confined to the Ruhr coal-field.

Brewing is also an important industry, and German beer has demand both in the country and outside. Glass, porcelain

[1] Germany lost most of its merchant marine during the World War II. The removal of all restrictions on the construction of sea-going vessels in 1951 impelled West Germany to revive the ship-building industry. The speedy success of the shipbuilding industry was possible because of the introduction of improved technical methods in construction and the large orders from other countries.

and earthenware are important in Bavaria. Other manufactures are fine mechanical instruments like instruments, typewriters, X-ray apparatus and chemical fibre. In typewriters, the Federal Republic is now second in world trade, not much behind the U.S.A. The X-ray industry of the Federal Republic has also regained its strong position in world trade.

Foreign trade. Western Germany which is a member of the European Common Market, has extensive trade relations with many countries.

In respect of world trade, her position is first among the European countries and second in the world after the U.S.A.

The imports consist of food-stuffs, raw materials, semi-manufactured goods and manufactured goods such as coal, coffee, cotton, cereals, dairy produce, copper, liquid fuels, crude petroleum, iron ore, paper, prefabricated chemicals, motor vehicles and aircraft, electro-technical products and office machinery. The total of finished products accounts for 48 p.c. of the total imports in terms of value. France, Netherlands, Italy, Belgium, U.K., Switzerland, U.S.A. and Japan are important in the trade of Western Germany.

Trade centres. Berlin is situated in the centre of the northern plain and is provided with facilities for communication in every direction. It is an important industrial and commercial town and it is also the centre of the railway system of the country. Berlin is now divided into West Berlin and East Berlin. The latter is the capital of East Germany. *Hamburg* is an important river port situated on the Elbe, sixty miles from the sea and has large foreign commerce. *Cologne* is a river port situated on the Rhine. Apart from its importance as a railway centre, the town is noted for wine-making and steel-production. *Bonn* is the capital of Federal West Germany. *Nuremburg* is famous for toy and pencil factories. *Bremen* is situated on the Weser and is important for shipbuilding.

West Germany's industrial weakness: (*i*) Although West Germany is a great iron and steel producing country, her supplies of iron-ore are very limited. More than two-thirds of Germany's requirements have to be imported from Sweden, Spain, Luxemburg, Algeria, France and the U.S.A. (*ii*) She is very deficient in copper, tin and bauxite. (*iii*) Toughening minerals such as manganese, chromium, tungsten, nickel,

molybdenum, cobalt and vanadium are practically absent. (*iv*) Although the production of crude petroleum has gone up to 8 millions in 1967 from 635,000 tons in 1948, it is still very short of domestic requirements. There is a proposal to have an oil pipeline from the Adriatic coast of Italy to West Germany through the Alps. (*v*) Even with home-produced wool, flax and synthetic products the textile industry is only 35 per cent self-sufficient. (*vi*) West Germany is very short of vegetable oils and all tropical products. Her deficiencies in rubber and textile fabrics have been greatly overcome by the use of synthetic rubber and synthetic fibre.

Thus it will be observed that the rise of the industrial power of West Germany is the result of the intelligent use of meagre resources and the advancement in technology. The formation of the European Common Market has removed many of her deficiencies in respect of resources and man-power.

German Democratic Republic or East Germany as it is called has an area of 108,174 sq. km. with 17 million population. About 72 p.c. of the people are urban dwellers. The Republic has 6 million hectares of arable land, and the principal crops are wheat, rye, potatoes, sugarbeet, barley and oats. Since the country is not self-sufficient in food supplies, food-stuffs are required to be imported.

The Republic is the leading producer of lignite in the world. In 1969, it produced 255 million metric tons of lignite out of the world total of 722 million metric tons. It has rare metals like uranium, cobalt, bismuth, and antimony which are being mined in the western Erzebirge and eastern Thuringia. Coal and iron ores are found in extremely limited quantities, and the output does not exceed 1 million tons of each a year.

Large investments have been made on modern machines and equipment, on mechanising and automating the production processes. The industrial products are metallurgical, chemical, textiles, leather, paper and machinery. The main exports go to *U.S.S.R., Czechoslovakia, and Poland. The other destinations are West Germany, Hungary, Bulgaria and Netherlands. About 50 p.c of imports come from U.S.S.R. and 10 p.c. from Czechoslovakia.* The principal exports of the Republic are petroleum products, steel plates, automobiles, paper, wool and cloth.

East Berlin, the capital has railway connections with Budapest, Bucharest, Moscow, Sofia, Belgrade and Tirana. Rostock is the country's largest port. The other important towns are *Leipzig, Dresden, Magdeburg, Karl Marx Stadt (Chemnitz), Potsdam and Zwickaw*. Leipzig has a large book and printing trade. Dresden on the Elbe is known for machinery and brewery.

France

France is very suitably situated for world trade. It is the only country that faces both the northern and the southern oceanways of Europe. Northern France faces the English Channel, one of the greatest highways of commerce. The ports in the western coast are conveniently located for carrying on trade with America and Africa. The southern ports are nearer to Asia and Australia than the British ports. The area of France is about 550,786 sq. km. or more than twice that of Great Britain. Her population in 1969 was 50 millions. The average density of population is about 51 per square km.

Economically the most striking thing about France is that she is virtually self-contained. France remains largely an agricultural country and imports little for the subsistence of her people. The farm population constitutes about 35 p.c. of the total. There has not been much migration of farm labour to urban areas. The advantage in taxation enjoyed by farmers and their attachment to land have always tended to discourage migration. Because of her varied topography and climate, she has the great variety of agricultural products. Cereals form the most important crops, and of these wheat stands first. France can feed her population with her present acreage under wheat (about 4.4 million hectares). The production of wheat is about 14 million tons with average yield of 3600 kg. per hectare. The yield can be as high as 4600 per hectare. The secondary cereals are oats, barley and rye. Of industrial crops, the most important is beet for sugar and molasses, and for alcohol. The production of sugar beet in 1967 was 13 million tons.

Fruits are important in the southern part of the country where lemons, oranges, grapes, olives and figs are abundant.

Silk-worms thrive best in the mulberry trees, France being one of the leading producers of silk.

France is self-sufficient in her requirements of pork, butter, vegetables, dried fruits, cheese and wine. She is deficient in maize, vegetable oil, potatoes and dried vegetables.

Mineral Resources : The mineral wealth of France is of considerable importance. *In iron resources, France is the leading country in Europe.* France raises about 18 million metric tons of iron ore. The highest production was in 1961 with 22 million tons, which was 10 p.c. of the world's total. The rich iron deposits of Lorraine give France an unlimited supply of the mineral Lorraine ores are of low grade and contain about 40 per cent of iron. Their great importance lies in the fact that they are found near the German, Belgian and French coal-fields and the great industrial market of Europe. Iron ore is also found in Normandy and Brittany in the north and in the Pyrenees in the south. Iron ore production in 1963 was about 58 million tons. *But the country, generally speaking, has not adequate supply of coal.* The most important coal-field lies in the north-east near Lille. Other fields exist around St. Etienne in the middle near Le Cru Sot and in the Rhone delta. A little coal is also found at Alais in the south. In view of the great industrial expansion, the total supply of coal cannot meet the requirements of the country and the need for import is always urgent. The coal mining operations are handicapped by the burden of high ways and high production costs. A few years ago petroleum field was discovered in the south-east of France and drilling has already begun at St. Marcel. *France offers unique opportunities for the great development of hydro-electricity.* The manufacturing industries and transport of the southern side can be served by water-power. The water-power resources of France are more evenly distributed and less vulnerable than coal-fields; the main suply comes from the Pyrenees and from Alps. So far very little has been done in this direction. The inadequate supply of coal and the meagre development of water-power cause much of the iron-ore to be exported. She is the world's larges producer of bauxite from which aluminium is made. Alsac has large deposits of potash. After China, France is the larges producer of less important ore, antimony.

Manufactures and Industrial areas in France

France is one of the leading industrial countires of the world with highly developed mechanical engineering, automobile and textile industries. The industrial production of France has doubled between 1957 and 1967. There are three major industrial regions: the north industrial basin, the Lorraine industrial region and the area around Paris. Many industries are scattered throughout the country, increasing the costs and weakening the economy. *Certain manufactures are characterised by richness of quality, elegance of design and artistic finish,* such as beautiful fabrics and laces, porcelains, jewellery, millinery, ladies' gowns, toilet goods, etc.

The strength of the textile industry lies in the production of popular articles and luxury style goods. Among the textiles, wool, silk and cotton deserve special notice. The cotton textile industry of France is two hundred years old and was first established in Alsace. Even today, Alsace is a great centre of production of high-quality goods. The northern coal-fields and the Rouen district, both in the Paris basin, produce cotton goods of superior quality with American raw cotton. The manufacturing centres are Lille, Amiens, St. Quentin and Rouen. In spite of the scarcity of raw materials and war damages, the textile industry has almost reached pre-war level.

The northern coal-field is also important for the woollen industry. In addition to the local supply from Champagne and Picardie, a considerable quantity of raw wool is brought from Argentina, Australia and New Zealand. The woollen centres are Roubaix, Rheims, Amiens and Lille.

France is one of the leading silk-manufacturing countries of the world. In the Lyons district of the Rhone Valley, where mulberry trees are abundant, the silk industry is highly centralised. Power is obtained from the St. Etienne coal-field and the hydro-electric installations. The great development of the silk industry has necessitated the import of raw silk from China, Japan and Italy.

In spite of the shortage of coal, France is an important producer of iron and steel. In 1969 her crude steel production was 23 million tons. More than 60 p.c. of raw steel production comes from factories in Eastern France based on the ores of

Lorraine. The iron industries are concerned with the production of motor cars in Clermont, locomotives in St. Etienne and textile machinery in Lille.

Production of *electrical goods* occupies a very important place in French economy. About one-sixth of the products is exported. France has also developed a large *ship-building* industry, and her shipping tonnage gives her the fifth place in the world. Marseilles and the tidal estuary of the Seine are the two important ship-building centres.

France is the greatest wine-producing country in the world. The chief centre is Bordeaux. The production has not yet reached the pre-war level specially with regard to cider.

In the field of *chemical production,* sulphuric acid, carbonate of soda, carbide of calcium, nitrate fertilizers, superphosphate, colouring products, tanning products and colours and varnish are the principal products. The output in each of these except colours and varnish is on the increase.

Transportation : Because of the strategic location, France has always played in Europe and in the whole of the western world, the part of a major cross-road. The location compelled the country to develop an efficient transport system by road, rail and water. In air transport also, France has been pioneer.

Since ancient times, France has been noted for her roads. Nevertheless, the quality of her roads falls far behind Germany and U.S.A. She has about 780,000 km of roads. In commercial aviation, too, she has made good progress in the matter of traffic and the length of air lines The national air line not only serves the important cities of the country but also Europe, North America, Central and South America, Africa, Middle and Far East and Australia.

The inland waterways of the country play an important part in the movement of goods from one part to another. The rivers are connected with one another by canals and thus provide a complete system of waterways. The canals and rivers are particularly important in the north-east and in the central region where the traffic includes coal, building materials and agricultural products. The important rivers are the Seine, Oise, Meuse, Saone, Rhone, Rhine and Loire. The combined length of canals and navigable rivers is more than 9000 km. Many of the rivers of France are quite free from tolls. The Rhone

has a rapid current and in many places it reaches 12 miles per hour. A scheme was formulated by the French Government to harness the waters of the Rhine and its tributaries with the following objects: (*a*) The generation of hydro-electricity. This will save an annual consumption of six million tons of coal. (*b*) Irrigation. During the hot and dry summers the Lower Rhone valley would profit by irrigation. The length of the Rhone is 450 km. "It is important not so much for navigation as for the fact that its valley forms the best natural highway through the mountains of Southern Europe. Consequently,

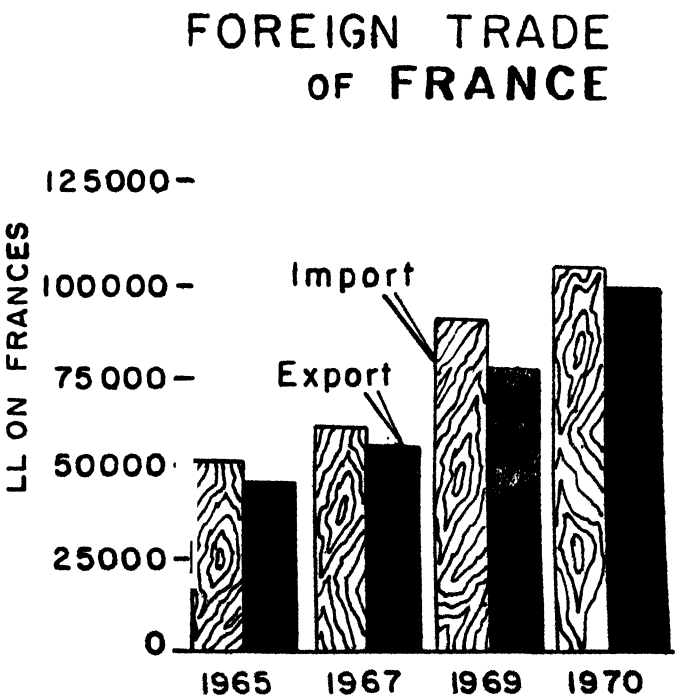


FIG. No. 65. Foreign Trade of France

it has always served as an important avenue of trade between the northern and southern portions of the continent." The Seine with its tributaries provides the best water transport system in France. It is 780 km long.

The length of the river canals is a little more than 4,700 km. The important canals are: (*a*) The East, connecting the Meuse with the Moselle and Saone, (*b*) the Nates-Brest canal, and (*c*) the Loire canal. There are certain drawbacks in the French waterways. These are (*i*) want of good inland ports, (*ii*) slowness of transit, (*iii*) great length of the journey, and (*iv*) the inadequate facilities in some of the canals for the transference of goods to or from the railways.

Foreign Trade. France is the only great manufacturing country in Europe that is almost self-sufficient in food products. Cotton, wool, minerals, fuels, machinery, iron and steel, oil-seeds, hides and skins are its chief imports. From the French colonial possessions sugar, rice, coffee, and wild rubber are imported. Alcoholic beverages, textile fibres, petroleum products, chemicals and medicines, iron and steel goods, machinery and cereals are the chief exports.

DIRECTION OF FOREIGN TRADE, 1969

(In million francs)

Total Export	...	99,640	Total Imports	...	106,190
West Germany	...	23,441	West Germany	...	20,490
Belgium	...	11,920	U.S.A.	...	5,304
Italy	...	9,806	Belgium	...	10,929
U.S.A.	...	6,538	Italy	...	11,107
U.K.	...	5,412	Netherlands	...	5,599
Switzerland	...	2,836	U.K.	...	4,050
Netherlands	...	6,267			

About 50 per cent of her exports go to western European countries and U.S.A. The buyers, in order of importance, are West Germany, Belgium, Italy, U.S.A. and U.K. The chief imports are from West Germany, U.S.A., Belgium, Netherlands and Italy.

Trade Centres. *Paris* is the political, commercial, financial, cultural and educational centre of the Republic. Although it is about 150 km from the Sea, its location on the bank of the navigable Seine has made it the leading port of the country. The railways radiate from Paris. *Havre* is situated at the mouth of the Seine and is a great seaport. It has exten-

sive trade with North and South America. *Lyons* is situated on the Rhone and is the largest silk manufacturing city of the world. Raw silk is obtained from the Rhone-Saone valley, but the greater part is imported from Italy, China and Japan. The silk industry is carried on in cottage and small factories within the city. In the industrial suburbs of Lyons a great development of artificial silk manufacture has taken place. Already Lyons produces about 80 per cent of the artificial silk manufactured in France. *Marseilles,* on the Mediterranean coast, is the most important port of France. With its local supply of olive oil and easy importation of vegetable oils from the Tropics, Marseilles has become one of the world's chief centres for the manufacture of soap, margarine and candles. *Bordeaux,* on the west coast, is the chief centre for the exportation of wine. Within recent years great development has taken place in ship-building. *Rouen,* situated on the Seine, is a great cotton manufacturing town. *Lille,* on the north-east coal-field, is a town noted for linen manufactures. Cotton is also manufactured here. *St. Etienne,* near the great coal-field of the middle, is a great industrial town. The chief industries are those of iron and silk-ribbon goods. *Dunkirk* is the leading port with regard to exports from France. It has already become a major industrial area of France. In near future it may enter into serious competition with Antwerp and Rotterdam. At present many industrialists of Northern France prefer Belgian and Dutch ports because of lower port changes—sometimes half those of Dunkirk.

Switzerland

A continental State with no direct access to the sea, Switzerland is one of the smallest European States. Although her total surface is only 41,000 sq. km., her population in 1968 was 6 millions. Seventy per cent of the entire population speak German, twenty-one per cent French, six per cent Italian. Far from being a cause of dissension, this diversity of languages constitutes one of the chief reasons of Switzerland's existence in Europe.

It is the most mountainous country in Europe. The Alps in Switzerland is the source of many rivers which flow to all parts of Europe.

Wheat, rye, oats, barley, maize, potatoes and tobacco are the chief agricultural crops. The cultivation of fruits is a prominent branch of Swiss agriculture. The districts near the Lakes of Geneva, Neuchatel, Biel and Zurich are noted for vine-growing. Pasturage constitutes one of the principal features of Swiss husbandry, forming the basis of cattle-breeding and milk production, the development of which ranks among the most important factors of Swiss economy. Besides the production of milk and meat, pedigree cattle-breeding for exportation constitutes one of the principal items. Switzerland's main item of dairy produce is cheese, the consumption of which is considerable both at home and abroad. The cheese trade is conducted at Berne, Lucerne, Zurich and St. Callen. Only about three-fifths of the population can be fed on the produce of the soil, and two-fifths are permanently dependent on food import.

The country is poor in minerals. *Coal* is totally absent. *Real marble, asphalt, salt and glass-sand are found.* Iron ore and manganese are mined in small quantities in St. Gall. The handicap due to the want of coal has been removed by the existence of innumerble waterfalls and rapids. Hydro-electric power is used in industries and transport.

Swiss production is essentially of the manufacturing type. Because 90 per cent of the raw materials are normally brought from outside, the people cannot produce cheap goods requiring much raw material for their manufacture. "The general tendency of industry is to seek compensation for the want of fuel and raw materials and for inadequate or expensive means of communication by the manufacture of commodities on which skilled labour may be expended ; of this tendency the electric and chemical industries and watch-making are typical." In industry, efforts are also being made to bring rationalisation and automation to overcome the man-power shortage. Swiss manufactures have a good reputation in the world market. Recently, the chemical industry has become very important from the point of view of exports. About 25 per cent of total exports consists of chemical products, especially medicines.

Silk industry occupies an important position in the textile branch. This industry is geographically limited to southern Switzerland. Four-fifths of the products are destined for exportation. The Swiss silk goods are in great demand through-

out the world. The industry is centred at Zurich. Silk ribbon industry is carried on at Basle. A large portion of the world's consumption of ribbon is covered by Switzerland which exports over 95 per cent of its total production. Embroidery and lace industry, knitting and linen industry and hosiery are the other branches of textiles, which are equally important in Switzerland. About 60,000 workers are employed in textile mills.

Swiss metal works furnish articles of aluminium, copper, brass, nickel and all kinds of alloys. Aluminium bars are turned out in large quantities. *Watch-making is one of Switzerland's oldest and most prosperous industries.* It is mainly carried on in the Zura district. The industry engages about 75,000 hands. More than 95 per cent of the output of the watch-making industry is destined for exportation. The industry ranks first in the world, and exports watches and clocks to the extent of 48 million in number a year normally.

Condensed milk, chocolates, cheese, biscuits, etc., are the chief products of the food industry.

The touring and hotel industry of Switzerland is of considerable importance. No other country in the world offers, in so limited an area, such a great variety of natural beauty and picturesque scenery as Switzerland does. It is known as the 'Playground of Europe'. Practically every type of European climate is to be found within her boundaries. Large numbers of people from different parts of the world visit the country and provide a very important source of income to the State.

Transport and Trade : Her railway system is highly developed, ranking third in Europe, next to Belgium and England. The most striking feature of railway development is the marked progress in electrification. At present more than 70 per cent of the Swiss railways is electrified. Aviation is rapidly developing.

Switzerland has an unfavourable balance of trade. More than 60 p.c. of her imports consist of iron and steel, machinery and transport equipment, and food products. The principal exports are watches and clocks of all kinds, chemicals and machinery. Watches and clocks make about two-fifths of her total exports.

The most important buyers are the five countries, viz., West Germany, U.S.A., France, U.K. and Italy which take between

themselves more than 50 p.c. of Swiss exports. Among th sellers, Germany occupies the first place and sells about one-thir of Swiss import.

Berne is the seat of the Government and the centre o political and economic life. It is also a route-town. Th largest town is *Zurich*. It is not only a great railway centr but a great industrial town also. It manufactures cotton, sil and machinery. *Basle*, situated on the bend of the Rhine, one of the most important traffic junctions between Switzerlan Germany and France. Other towns are Geneva, Lausann Fribourg and Lucerne.

The Netherlands (Holland)

The Netherlands is one of the smallest of European cou tries. It has an area of about 33,400 sq. km. with 13 milli population (1970). The density of population is 370 per squ km. of area, being the highest in Europe and fourth in t world. It is a lowland country and one-fourth of the land actually below sea-level. About forty per cent of the Neth lands consist of reclaimed land.

The character of both the coast and the surfaces has m the Dutch essentially a commercial people. The Dutch migra to different parts of the world and acquired rich trop colonies.

Agriculture is highly intensive and more than seventy cent of the land is under cultivation and pasture. The princ crops are oats, rye, wheat, barley, flax, sugar-beet and potat

The alluvial origin of the soil accounts to a large ex for the small variety of minerals in the country. Coal is fo at Limburg in southern Netherlands. The production of is about 8 million tons. In 1970 the crude oil production 1·9 million tons. There are also salt mines in the country. largest gasfield in the world has been found near Gronin and the production reached 6991 million cubic metres.

The industries of the Netherlands are those which (*a* quire less raw materials or fuel but much skill, (*b*) are direct outcomes of agriculture, and (*c*) are based on col imports. The outstanding industry is dairying and the m facture of milk products. The fertility of the soil, coml

th the humidity of the climate, makes the country an ideal gion for dairying. *The Netherlands has more cattle per uare km than any other country in the world.* Cheese, butter, ndensed and powdered milk are extensively made. The deve- pment of dairying has led to the neglect of home production cereals of food. At present there is a large import of bread d for people and cake for cattle. The Dutch depend to a ge extent for their prosperity on dairy industries. The farm- pulation density is 5 acres of land per head, which, however, s not brought low productivity and income because of the ghly technical methods of production. In fact, agriculture has en able to offer a higher standard of living, and land pro- ctivity in the Netherlands is the highest in the world.

The other industries are ship-building, the manufacture of achinery, textiles, brewing and diamond cutting. The flat rface of the country below the sea-level makes it convenient use wind-power in mills and factories.

Water-transport is everywhere more important than trans- rt by rail or road. There are more than four thousand miles waterways provided by the rivers and canals.

The country has a large entrepot trade. Its mercantile arine ranks seventh in the world. The principal exports are emical products, electro-technical materials, machinery, dairy oducts, transport equipment and mineral fuels. Imports con- of food, mineral fuels, textiles, machinery, etc.

Amsterdam, the largest city, is the capital of the kingdom. is situated on the west side of the Zuider Zee and is linked ih the North Sea by a canal. The city has a large trade with donesia and imports rubber, cocoa, tin, rice, spices, tobacco, pra, etc. It is famous for diamond cutting and polishing.

Rotterdam, the largest port in the continent and the second rgest in the world, is situated on a distributary of the Rhine- d is connected with the sea at the Hook of Holland by a nal known as the "New-waterway". It is the natural outlet the Rhine basin. The port handles three-quarters of all utch trade. The principal exports are flax, linen, dairy pro- ce and cattle. The imports include rice, sugar, indigo, coal d petroleum. Rotterdam has a large trade with Germany the East. Rotterdam handles about 150 million metric ns of goods. *The Hague* is the seat of the Government. Its

principal industry is pottery. It is a city of great international importance. The other centres are *Utrecht, Haarlem* and *Flushing.*

Belgium

Belgium with 30,000 square km of area is one of the smallest States of Europe. *Northern Belgium* is a plain and consists of coastal lands. *Flanders* in Northern Belgium is a region of plains with low hills. It has the largest proportion of cattle in Belgium and various industries have developed here. *Central Belgium* is an extension of the fertile plains and coal-fields of northern France. Central Belgium is a great agricultural region ; mining centres are also growing. *Southern Belgium* is formed of the highlands of the Ardennes which continue into Luxemburg. The facility for commerce is great as the country lies near the focus of great ocean trades and touches three leading commercial nations—France, Germany and Netherlands, and is close to England. It is situated near the mouth of the Rhine, the chief commercial river of the continent.

Belgium is an extremely densely populated country. The population in December 1970 was 10 million. The population density per sq. km. of area is 301. In Flanders in the north, the density is as high as 500 per square km.[1]

Belgium is highly industrialised and yet it has a flourishing agricultural activity. Cultivation covers approximately 60 p.c. of the territory surface. Agriculture in Belgium is scientific and intensive, but production falls short of demand. It imports large quantities of Dutch produce, mostly, butter, cheese and some horticultural goods. The country produces wheat, barley, oats, potatoes and sugar beet. Dairying is important in the farm-economy of the country. In 1969, the total weight of fish landed amounted to 50,000 tons. The country has deposits of coal, iron and zinc but coal is an important mineral from the point of view of economic development. Coal is found in proximity with iron ore in the north-west of the country, where a great iron and steel industry has developed. The chief centres of

[1] Belgium has real linguistic and cultural problems because its frontiers have not coincided with the distribution of ethnic and linguistic groups. There are French-speaking Walloons and the Flemish-speaking Belgians—each striving for cultural and economic superiority.

industry are Mons, Charleroi, Namur and Verviers. During ent years a few new coal-fields have been discovered in the rth-east of the Lys basin. In 1969, coal production was 13 llion tons.

Belgium is a great manufacturing country. To ensure a h standard of living for its dense population, the country s forced to develop industries from the middle of the hteenth century.

The textile industry still plays an important part in the lustrial activity of the country. Its works include every known nd of textile fibre like cotton, wool, flax, jute and rayon. ne cotton industry is the vital branch of the Belgian textile dustry by the number of its spindles and looms as well as the mber of workers employed. Cotton blankets are in great mand by foreign markets. Cotton carpets also contribute wards the export trade. The woollen industry is the oldest anch of the textile industry. Ghent, Antwerp and Courtrai anufacture cotton goods and Verviers woollen goods. Linen anufacturing is very important in Ghent, Courtrai, Roulers d Tournai. Owing to the quality of Belgian flax, this in-ustry enjoys a universal reputation. The growth of this in-ustry has been helped by the following factors: (*i*) the in-erited skill of the weavers in spinning and weaving, (*ii*) large pplies of flax in the central plains and (*iii*) supplies of coal om the Belgian coal-field. The finished metal goods indus-ies including mechanical and electrical engineering are of eat importance and 18 p.c. of the country's exports is counted for by them. The main groups of products from on and steel industry are moulded steel, sheet iron, railway erials, ship-building, automobiles, machine tools, metallic lding, accessories and so on. The other industries are micals, glass, ceramics, rubber and paper.

The means of communication by land, air and rivers are ellent and serve commerce extensively. *Brussels* is the centre the railway system. The rivers are navigable and connected h one another by canals. The Belgian air-lines system has nches throughout Europe.

The country has a large trade with France, Germany (W), K. and Netherlands. The imports consist of food, iron ore,

mineral oil, chemicals, wool, cotton, non-ferrous metals, mac nery, rubber manufactures, etc. Netherlands accounts for p.c. of the imports, and West Germany about 18 p.c. Franc sells about 15 p.c. of the total imports of Belgium. The shar of U.S.A. is between 8 and 10 p.c. The chief exported good are iron and steel products, coal and coke, chemicals, manur and textiles. Belgium exports about 40 per cent of its entir production of manufactures. About 60 p.c. of the imports con from U.K. followed by West Germany with 20 to 25 p.c. Th share of U.S.A. is hardly 8 p.c.

Brussels is the capital and is situated on the River Senne. Its excellent situation—halfway between the coal-field and the sea—has made it a great trade centre. Lace, carpets, furnitur and paper are made. It is connected with Antwerp by a can and railway.

Antwerp, at the Scheldt estuary, is the greatest port Belgium. It has large entrepot trade and competes with Hamburg and Rotterdam. Its hinterland indicates part Eastern France, the Rhine valley and the Ruhr valley, in add tion to Belgium proper. It is also a great industrial centi *Liege* is situated in the heart of the Belgian coal-field. It noted for chemicals, glasses and metal works. *Ghent* is great linen-manufacturing centre. *Verviers* in the Southen Highlands, is noted for woollen goods.

Denmark

Denmark has an area of about 44,000 square km and lie seventy miles south from the coast of Norway. The situatio of the country is particularly important as it controls the natura routes between the North Sea and the Baltic Sea. The countr has plains and low hills ; no part of the country has an elevatio of more than 550 feet. The west coast of Denmark is a line dunes with sandy beaches and much surf and therefore this of the country is very sparsely populated. But the Baltic sid is fertile and more people live here. The total population Denmark was estimated at 5 millions in 1970.

Among the European countries, Denmark has attained highest agricultural efficiency. The agricultural area represen

5 per cent of the total area. About 88 per cent of the harvest ; used for feeding cattle, horses, pigs and fowls.

Denmark is the pre-eminent dairy-farming country of the world. The keeping of milch cows and milk production is the ackbone of Danish agricultural industry. It is the key indus- y for the economy of the community; and through this pro- duct exchange of goods with other countries is made. The ollowing factors have given Denmark its pre-eminence as a airying country: (*i*) "Most of the farms are small so that each amily must obtain a large yield from a small area of land: "[11] (*ii*) "Denmark has preferred the system of the utilization of rable land to produce food-stuffs for cattle; by this method nore cattle can be kept than on the same area of pasture and dow land.' *Denmark's success in dairy-farming is mainly nded on co-operation.* 88 per cent of the dairymen belong o-operative societies, and 92 per cent of milk is handled by same association. The aim of the co-operative dairies of nmark has been to produce a standard quality good enough gain the confidence of the buyers. The Government also intains a strict system of inspection both of the farms and of export products. Eighty per cent of milk is used for making ter and ten per cent for cheese and condensed milk, the rest consumed locally.

Fishing industry and a large mercantile marine have deve- ed because of the seas and fjords with which Denmark is rounded. The fish caught are chiefly cod, mackerel, haddock, rings, lobster and shrimps. The prosperity of Denmark, how- r, will always depend on the ability to supply provisions to industrial areas of Western Europe. Tourist trade accounts 5 p.c. of foreign trade.

Industries employ about 20 p.c. of the people. The prin- pal industries are concerned with the production of textiles, per, leather, rubber, chemicals, metals and tobacco. About

[11] "Denmark's farm produce comes from about 200,000 independent rms, of which about 40 p.c. have an area of between 10 and 30 hectares, p.c. between 30 and 60 hectares and only about 2 p.c. have an area or more hectares." (The International Year Book, 1969, Burke's erage Ltd. London, 1969, p. 182).

one-third of the country's industrial production is sold abroad.[12] Both for exports and imports, West Germany and U.K. are important.

With recent industrial expansion and a constant increase in agricultural productivity, Denmark is having the largest foreign trade per capita in the world. The dairy produce and meat account for 52 per cent of the value of Danish exports. Exports of machinery and transport equipment account for 20 p.c. of the total export. West Germany, Sweden, U.K. and U.S.A. supply more than 65 p.c. of total imports and take 55 p.c. of exports. U.K. alone takes a little more than 20 p.c. of Denmark's exports. Denmark is a member of the European Free Trade Association which also includes U.K., Norway, Sweden, Switzerland, Austria and Portugal. The Association is commonly called "the seven".

Copenhagen is the largest city in the country. It is situated on the east coast of Zealand and contains nearly one-fifth of the population of Denmark. It stands at a crossing of land and sea routes. The opening of the Kiel canal has affected its trade adversely. Copenhagen is an entrepot for the products that the Baltic lands buy or sell. Textiles, boots and shoes beer and pottery are the important products. *Esbjerg* is situated on the west coast of Jutland and is an important fishing centre *Aarhus* and *Odense* are the two other largest towns on the eastern side of the country.

Norway

Norway is a mountainous country forming the western portion of the Scandinavian peninsula with an area of 324,000 square km. In spite of its northerly position the coasts of Norway are always ice-free, because warm surface water drifts across the Atlantic Ocean against the whole Norwegian coast. The coast-line is extensively indented with fjords and fringed with a large number of rocky islands. At many places fjords

[12] Danish industry has made an international impact only in the last decade through increasingly varied production based on imported raw materials and semi-manufactures. Extensive technical knowledge, high quality standards and a considerable degree of specialisation have been the basis for a competitive production.

les rise almost perpendicularly from the sea for several ındred feet. The stream form magnificent waterfalls.

Generally speaking, more than two-thirds of the country is ıtirely unproductive because of lakes, rivers, mountains and ırests. Only 3·6 per cent of the total area of Norway is under ıltivation, and large continuous tracts fit for cultivation do ot exist. Northern Norway and the coastal areas are having eline of economic life because of the stagnating fishing and griicultural industries.

The population is 3·9 millions, and the average density is 1 persons per square km. The south-eastern part of the ountry is densely populated. The major occupations of the :ople are concerned with agriculture, fishery, forestry and nanufacture.

More than 15 per cent of the population depend on farming, the greatest single industry in the country. The most haracteristic feature of the farm economy in Norway is its close ntegration with forestry, fishing and other occupations which provide employment for a large part of the farm population. eat, oats, barley, rye and potatoes are the chief crops. In ent years dairying has developed considerably.

Fishing is a very important industry of the country where re than 51,000 persons are employed. It has always been one the most important sources of income for Norway. The prinal catches are cod, whale, tuna, seal, mackerel, salmon and ring. "The greatly indented coast with its long line of proting islands provides numberless harbours for the fishermen d good spawning grounds for the fish." Cod is found around e Lorten islands and Finmark in the north, while in the south Stavanger and Haugesund herring is abundant. The catches id a ready market in those European countries which have fisheries. Cod-liver oil and other fish oils have a world arket. *Stavanger* engages in canning fish for the export arket; *Kristiansund* is the centre for the dried cod; *rgen* is the chief fishing port. *Hammerfest* and *Tromso* are centres for northern fisheries.

Forests cover nearly one-fourth of the total area, and the ne trees account for about 70 per cent of the forest areas. forest products are very important and constitute more an one-fourth of the total exports. Norway uses a large

quantity of timber for building and for fuel, but there remains a large surplus which she formerly exported as lumber. Today Norway does not export much wood to other countries but uses it in the manufacture of wood-pulp and paper. On the average, 8 million cubic metres are cut annually for industrial use and 1.5 million cubic metres for fuel and domestic use. The annual natural increase is about 12 million cubic metres.

Iron ore, copper, zinc ore, lead ore and limestones are the chief minerals. Coal is practically absent which however has not proved to be a handicap in view of the large production of hydro-electricity for industrial purposes. *Spitsbergen* in the Arctic has certain coal mines. Iron ore is found in the far north on the border of Finland. The old rocks of the mountains contain fine granite.

Industries in Norway are mainly based on raw materials raised within the country and on water-power. Norway offers unique opportunities for the development of hydro-electric power. About 99 per cent of the electricity comes from hydro electric plants. There are many waterfalls, and rivers are swift-flowing and do not freeze in water. Wood-pulp, paper and matches, electro-chemical and electro-metallurgical industries are run with the help of hydro-electricity.

Many people from different parts of the world come to see the scenery of Norway and the money spent by these visitors is a considerable source of income to the country.

The roads and railways are mostly confined to the south east of the country.

Norway's merchant marine consists chiefly of tram steamers. Norwegian shipping is a private industry, entirely owned and operated by private individuals and companies. The geographical location with numerous good harbours, the facilities for building wooden ships on account of the abundance of timber, the ease by water and difficulty by land for communication, the exportation of timber and fish and the importation of coal, cereals and manufactured goods, account for the growth of Norwegian shipping.

Since 1963, there has been a strong economic expansion in Norway. Sharply increased foreign demand for Norwegian exports combined with a more moderate rise in domestic

emand has led to an unusually large increase in production nd virtually eliminated the balance of payment of deficits.

Fish and fish products, paper and newsprint and non-errous metals are the traditional exports. The other chief xports currently are chemicals, metalliferous ores and machi-ery. Sweden is the principal buyer and accounts for about 0 p.c. of Norway's finished products. West Germany and U.K. re the other two important buyers.

Oslo, the capital is situated at the head of long fjords in he south-eastern lowland of Norway. It is connected by rail-way with Bergen and Trodhjem. *Bergen,* the second largest own, exports large quantities of fish to the European countries. *Trodhjem,* the northerly railway centre, exports herring fish. It was the ancient capital of Norway. *Narvik* is an important port of Norway in the Arctic Ocean. It is connected with the Swedish railway system. During winter the iron ore of Sweden is sent to Narvik by railway as the Gulf of Bothnia is ice-bound at this time.

Sweden

Sweden occupies the eastern portion of the Scandinavian peninsula. Most of its coast-line faces the Baltic which is frozen during the winter months; the coast-line is not much indented. The climate is continental. Plains and lowlands cover the southern side, while the north is mountainous.

Sweden is a land of farms and forests. About one-sixth of the population is engaged in agriculture and forestry. The area of Sweden is 450,000 square km.; over half of it is forested. Although it is smaller than Norway in size, the area of its productive land is greater. The population is about 8 millions.

Norrland is the northern part of Sweden and represents about 60 p.c. of the total area of the country. It is a region of very recent colonisation. Immediately to the south of Norrland is a lowland, the *lake district,* which is highly developed both agriculturally and industrially. *Smaland* occupies the central area of Southern Sweden. It is an area of forests, swamps and moorlands, and the population is very sparse. The extreme south-west of Sweden, known as *Scania,* is the richest agricultural region in the country.

The mineral wealth is considerable and for many years, Sweden was known as one of the leading mineral-producing countries of Europe. The minerals are iron ore, silver, lead, copper, manganese, zinc, pyrites and gold. The iron deposits of Sweden are the most famous in the world for quality. High grade iron-ores exist at Kiruna and Gullivara in Northern Sweden. Because of high quality, the enormous reserves, the excellent location of the mines, the dearth of coal in Sweden for reducing iron ore, and the need for high grade iron ore in the West European countries, the bulk of iron ore is sent outside. Almost the entire production is sent to Germany and England: 33 per cent *via* Narvik and 65 per cent by way of Lulea.[13] The country is poor in coal though in Southern Sweden some coal of good quality is found. Recently great progress has been made in water-power. The greatest hydro-electric power station is situated at Porjus, which supplies power to railways and industries. The government holds a large interest in water power production although, generally speaking, the economy is based on private enterprise.

In no other country of the world are forests so important for national prosperity as in Sweden. Forests cover about 55 p.c. of the total land. Its production of pulp, which rose from 5.5 m tons in 1960 to 9 million tons in 1969, is exceeded only by that of U.S.A. and Canada. Because of the small size of the domestic market, it is the world's largest exporter of pulp. The forest-based industries—timber, pulp and paper account for about 10 p.c. of Sweden's industrial production. Pine and spruce supply the major volume of wood. The important saw mills are located along the shores of the Gulf of Bothnia. Forests and the existence of sulphur within easy reach give Sweden a prominent place in the match-making industry. *Jonkoping* in Smaland is a great centre for the manufacture of matches, which are produced in immense quantities and exported to every port of the world.

Only 9 per cent of the land is under cultivation. The Scania peninsula raises wheat, barley and rye. Sugar beet is also cultivated. The co-operatives are quite common in agriculture. The

[13] During the winter months, when the Baltic is frozen, ores are exported through Narvik in Norway. Narvik is connected with the Swedish railways.

ountry is more or less self-sufficient normally in respect of ricultural products.

Sweden has made a fairly good progress in the different ranches of manufacturing industry on the basis of lumber, iron and water power. The domestic market being limited, wedish industry is not generally based on mass production. Quality has had to make up for what is lacking in quantity. By concentrating on precision manufacture, Sweden has won place in the world market for many special products such as all-bearings, refrigerators, telephones, electric machinery and elf-propelled railway vehicles. The other important branches are wood and paper industry, match factories, textiles and sugar efineries.

In the total foreign trade of Sweden, the members of the European Free Trade Association (EFTA) have a share of about p.c. and the European Economic Community about 30 p.c. The chief exports are paper and paper-pulp, logs and lumber, on and steel and manufactures of metals. The imports include al, textile goods, food-stuffs, and machinery. U.K., West ermany, Norway and Denmark together take about 40 p.c. of he exports by value. With regard to imports, more than 60 p.c. ne from West Germany, U.K., U.S.A. and Netherlands.

Stockholm, the capital of Sweden is a great industrial and ailway centre. Located as it is on the eastern side of Sweden, t is away from the main trading routes. Moreover, access to Russia is hindered during winter as the Gulf of Finland is ice-ound. *Goteborg* is the great trading centre of the country. t is situated on the west of southern Sweden. It is ice-free and excellent canal and railway communications with all parts southern Sweden.

Italy

The Republic of Italy has an area of 301,000 square km with 54 million population (1970).

Italy's position at the head of the Mediterranean Sea is one the most significant in the world. It has sea on three sides nd by thrusting southward into the Central Mediterranean, Italy has brought Europe nearer to Africa.

Geographically, Italy presents three major divisions, viz.,

(*i*) The Northern plains and the mountains.
(*ii*) Peninsular Italy.
(*iii*) The islands.

An Alpine type prevails in the high Alps and northern Appennines. The Northern plains have more or less the continental type of climate, as these are shut off from sea influences by the encircling mountains. Peninsular Italy has the Mediterranean type of climate. Italy's historical relics and picturesque landscape draw millions of tourists a year. About 24 million foreigners visit Italy annually from different parts of the world.

Agricultural Products : The outstanding feature of Italian agriculture is the great disparity between different regions on account of unfavourable distribution and great irregularity of rainfall. In the south vegetation suffers from too much rains in autumn and winter, and little in summer. Another limiting factor is the fact that 40 p.c. of the land is mountainous, and only 20 p.c. plain. The mountains are, however, important for grape vines and fruit trees. The concentration of population is the greatest in the northern plains where the soil and the climatic conditions are highly favourable to the cultivation of a variety of crops. Vine, wheat, maize, rice, flax, hemp and sugar-beet are cultivated with the help of irrigation. In 1967, Italy produced about 10 million tons of wheat. Rice is cultivated in the valley of the northern provinces by large-scale farming. With 756,000 tons of production in the Piedmont-Lombardy zone, Italy today ranks as the foremost rice producer in Europe. About two-thirds of the total production of rice in Italy are consumed internally, while one-third is exported mainly to Argentina, Switzerland, Germany and France. A large cultivation of vines throughout the country has placed Italy in the second position among the wine-manufacturing countries. The Mediterranean climate of peninsular Italy favours the growth of fruit. Olive, lemon, orange, apricot and fig are extensively raised.

Mulberry trees are also found in the south in large numbers as a result of which Italy has become the largest silk producer in Europe. With the exception of a few mountain areas, the mulberry can be grown in all parts of Italy. The important

regions are Lombardy, Venetia, Piedmont, Emilia, Tuscany, Umbria and Sicily. Mulberry was known in Italy as a fruit in very ancient times.

Minerals : One of the grave obstacles to Italy's sound economy is the inadequate fuel and mineral resources. The country has a long list of minerals like iron ore, coal, manganese, lead, zinc, crude sulphur, bauxite, mercury and aluminium, but excepting mercury she is not self-sufficient in any. The mining industry is most developed in Sicily, in Tuscany, in Sardinia, in Lombardy and in Piedmont. Of minerals sulphur is the most important. It is found chiefly in Sicily. Iron ore is obtained from the island of Elba and Tuscany. Italy is the largest producer of mercury. The chief mercury mines are the Monte Amiati in Tuscany, and the Idria. Ragusa, Gela and Fontanarossa in Sicily are important oil-fields.

Marble stones of the best quality are found in the country. White marble is worked at Carrara, Volterra and Pisa. Coloured marble is found at Verona, Siena and Genoa. Of late, Italy has made considerable progress in the utilization of natural gas. Natural gas accounts for 14 p.c. of the total energy consumption and is found in the valley of the Po, the Marches, Abruzzi, Apulia and Sicily. To make up for her lack of fuel, Italy has developed her water-power resources considerably. The relief of the country and the innumerable streams offer unique opportunity for the development of water-power. Italy has about 3000 hydro-electric power stations which produce 11 million kw.

Manufactures : The Italian industries are characterised by a large number of small enterprises and great concentration in a number of important sectors. Italy's manufactures are developing with remarkable rapidity because of (*i*) cheap labour, (*ii*) local market, (*iii*) water-power, (*iv*) State support, (*v*) skill and enterprise of the people. For long, most of the *manufacturing industries were of artistic or semi-artistic nature.* Glass-work, lace goods, earthenware and mosaics, marble-work, straw plaiting and cutlery are still the good examples of Italian manufacturing skill. Today, Italy has large mechanical, metallurgical, textile and chemical industries. The greatest weakness of the industrial development is the overwhelming dependence on imports of basic raw materials from abroad. Italy occupies an important place in world textile industry and trade. Normally, it is

the world's leading exporter of raw hemp and rayon yarn, second of cotton yarn and third of raw silk. The textile industry is the main source of employment in the country. It is estimated that 470,000 persons are employed in the textile industry, while about 380,000 are employed in complementary industries. About 25 per cent of the textile production is exported to foreign countries. *Italy holds a very important place for the production of artificial textile fibre,* being Europe's largest producer. The rise and growth of the artificial silk industry has been favoured by the following conditions: (*a*) abundant supply of electric power, (*b*) cheap raw materials, (*c*) skill of the technicians, (*d*) presence of a large body of workers specialised in silk reeling and manufacturing. The leading markets for Italian rayon are those of Germany, Holland, Denmark, India, Peru, Chile and Brazil. Italy produces about 8 million tons of pig iron and 16 million tons of crude steel. Among the various sectors of Italian production, the automobile industry is undoubtedly the most flourishing. Production of automobiles and other auto-vehicles is steadily on the increase. In 1969 Italy manufactured 1.5 million motor cars.

Substantial progress has been made to develop industries in Southern Italy. The regions are southern continental Italy, Sardinia, Sicily, and the Islands of Elba. To encourage this development, capital grants are made available to small and medium-size industries. Liberal exemption from taxation for industries is the common feature.

Transportation : The railways of Italy are well-developed and connect the ports with interior and Central Europe. Through the use of coastal plains, river valleys, passes and tunnels, Italy has constructed railway lines to maintain contact with European countries. There are two westward lines to France, one in the north to Switzerland, and three lines in the east to reach the Balkan peninsula. The length of railways in 1969 was 21,000 km. of which 16,000 km are state-owned. Lack of easy means of communication by river has hampered Italian progress in industry. The rivers are many ; but those which are navigable are few and confined mostly to the great northern plain. These are the Po, Ticino, Adda and Adige.

Foreign trade and Trade Centres : The principal imports of Italy are food stuffs, hides and skins, oilseeds, crude rubber,

raw cotton, iron ore, coal, petroleum, vegetable oils, paper, iron and steel, machinery and wood. The exports include food and vegetables, cotton yarn and fabrics, motor cars, mineral fuels, chemicals, iron and steel, machinery, transport equipment, footwear and scientific instruments. Normally, Italy has an adverse balance of trade which is made up by receipts from shipping, tourist expenditure and remittances from Italians abroad. Her imports come mainly from West Germany, U.S.A., U.K., U.S.S.R. and Netherlands. The other principal sellers are Kuwait and Saudi Arabia which send petroleum. In the matter of export, West Germany is the most important buyer, followed by U.S.A., France, Switzerland and Netherlands.

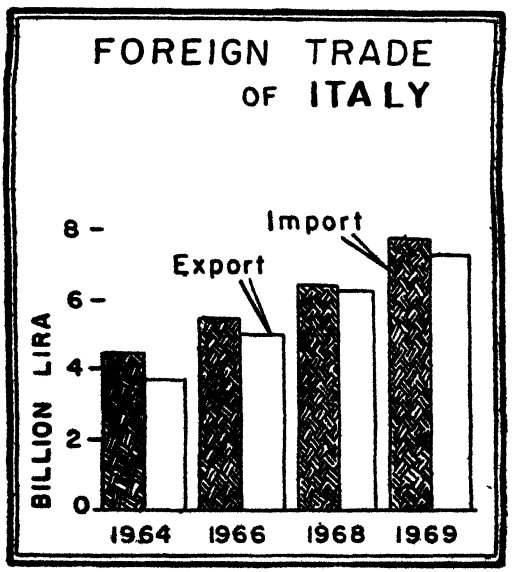


FIG. 66. Foreign Trade of Italy.

Milan is situated at the foot of the Alps. It is the greatest city of the northern plain. The silk industry, for which Italy is famous throughout Europe, is localised mainly in Milan. It has also engineering industries. *Rome* is the capital of modern Italy and one of the oldest cities of the world. Its population exceeds one million. *Naples* is situated on an excellent bay on the south-western coast of peninsular Italy. It is a great ship-building centre. The industries of the port use hydro-

electricity. *Turin,* a city of the northern plain, is famous for the manufacture of motor cars. *Trieste,* at the eastern end of the northern plain, is an important port. It carries on considerable entrepot trade for the countries of Central Europe. *Fiume,* on the eastern side of the Istrian peninsula, is a great port and a collecting centre. *Genoa* is a great seaport of the northern plain. *Venice* and *Genoa* were once very important trading centres of the world. They acted as entrepots; rich products of the East were brought to these places for distribution to Europe. Their importance declined with the opening of the Cape Route.

Yugoslavia

The Republic of Yugoslavia occupies the southern portion of the plain of Hungary and the central and the north-western mountain regions of the Peninsula. The area is about 256 square km and contains a population of about 20.6 millions (1970).

There is a paucity of good cultivable land because of the mountainous character of the relief. About 38 p.c. of the total area is arable. Wheat, maize, tobacco, rice, etc. are the principal agricultural crops. The methods of farming are being improved. Law limits private landholdings to 10 hectares and provides for expropriation of larger estates.

Cattle, sheep, goats and pigs are reared in the eastern part of the country. The country has considerable mineral resources including petroleum, coal, iron, copper and lead. Vares and Ljubija in Bosnia are the important iron ore areas. Copper ore is found at Bor (Serbia). Forest produce is an important source of income. About a third of Yugoslavia is clad with forests of oak, beech and pine.

The principal railway centre is Belgrade, which is connected with Istanbul in the south-east and Budapest in the north. It is also connected with Salonika in the south.

Inadequate supply of coal, inadequate means of communication, and mountainous character of the country are the obstacles to industrial and commercial development. But the future possibilities of the country are great in view of the raw materials and the location of the country. There is great tempo of industrial activity. A new five year plan of economic development was

adopted in 1966 in order to increase industrial production annually by 10 p.c. and that of agriculture by 4 p.c. There is a huge integrated iron and steel works at Skopje. The development of crude oil supplies in recent years has provided raw material for petro-chemical industry. The industries are sugar, flour milling and brewing, most of which are located in the northwest. Manufactures, machinery, transport equipment, food and beverages are the leading exports. The imports consist of machinery, textiles, iron goods, food-stuffs and fuel and lubricants. It has trade relations with many countries of the world, and the leading countries are U.S.A., U.S.S.R., U.K,, Italy, East Germany, West Germany and Czechoslovakia.

Belgrade is the capital of Yugoslavia. It is situated in the fertile interior plains at the confluence of the Danube and the Save. It is also the principal railway centre. *Zagreb* is the chief manufacturing centre of the country. It is connected by railways with Belgrade, Split and Fiume. *Split* is situated on the Adriatic coast-lands and is a very important port.

Hungary

Hungary is a small State lying in the middle of the Danube area. It has an area of 93,093 square km with 10 million inhabitants.

The plain of Hungary has acted as one of the granaries of Europe for many countries. Over 80 per cent of the cultivated land is devoted to wheat and maize. The other important crops are rye, barley, oats, sugar-beet, potatoes, tobacco, etc. More than two-thirds of the people are provided for by agriculture. Recently good progress has been made in vineyards and the country produces more than 200 million litres of wine. The most important wine producing district is the north shore of Lake Balaton. The best wines come from the north-east of the country.

Sheep-rearing, once an important occupation, is declining. Coal of good quality is found near Pects in the south-west which supplies nearly 90 p.c. of coal. Some iron-ore is found at Salgotarjen, but still a large consignment has to be imported to supply the needs of the metallurgical industry. About 75 per

cent of its petroleum comes from south-west corner of Trans-Danubia. Other minerals are coal and bauxite.

Hungary has a planned socialist economy, and her natural resources, banking and transport are all state-owned. 96% of all industry and 98% of agriculture are state-owned or cooperative. The economic development proceeds on the basis of a succession of three and five year plans. Considerable development has taken place in energy production, chemical and engineering industries and exploitation of natural gas. Budapest is the outstanding centre of flour-mills and is known as the "Minneapolis" of Europe. Cotton textile industry has been established recently.

Hungary has about 29,000 km of roads. The rivers are all navigable and provide important means of transport. A serious drawback is the lack of direct outlet to the sea. Hamburg, Fiume and Split—all outside Hungary—handle the foreign trade of the country. The length of railways in Hungary is 13,000 km.

The principal exports of Hungary are bauxite, rolled steel, petrol, alumina and food. The imports of Hungary consist of iron ore, coal, crude petroleum, wheat and timber. More than 60 p.c. of the imports come from U.S.S.R., East Germany and Czechoslovakia. Foreign trade is a government monopoly, carried on through State Trading Companies.

Budapest, the capital, is the chief manufacturing city. It is the greatest flour-milling town in Europe. Electrical machinery is also made here. It is also an important railway junction, and the natural collecting centre of the plain. The population is a little above one million. *Szeged* is noted for sugar-refining, distilling and brewing.

Austria

Austria is a small mountainous State of 83,000 square km. of area with population of about seven millions. It has a moderate climate of mixed continental and oceanic influences. The relief of the country permits a limited scope for the development of agriculture. The chief agricultural products are potatoes, wheat, rye, barley and oats. Lower Austria is agriculturally more important than Upper Austria. Forests are

considered as one of the greatest national resources of the country and provide raw materials to the paper, pencil and cellulose industries of the country. Forestry is important in the Alpine provinces. Lignite, iron, coal, lead, zinc and graphite are found. 90 p.c. of the production of iron ore is confined to Erzburg in Styria, and the country raises about 1 p.c. of iron ore of the world's total. Austria is one of the world's largest sources of high grade graphite. Metal industry is important. Other industries are the manufacture of machinery, chemicals, motor cars and leather goods. Austria's industry had suffered terribly during the World War II, but foreign aids coupled with natural optimism and technical and scientific capacity of the people brought about the revival of the country's productivity in no time. The largest oil refineries, coal extraction, factories, mines, iron and steel and ship building have been nationalised. Tourism is an important industry in Austria where annually about 5 million foreigners come as tourists.

Exports consist of leather manufactures, paper, textiles, iron and steel products, wood and lumber and machinery. The foreign trade is entirely dependent on foreign ports as the country has no sea-frontier.

Vienna, the capital, is an important educational, commercial and industrial centre. *Graz* is noted for iron manufactures. *Linz* is a railway centre.

Czechoslovakia

Czechoslovakia, a central European Republic occupies a position of great strategic importance in central and eastern Europe, and has 127,870 square km. of area and 14 million population.

The location of Czechoslovakia is favourable for the purpose of commerce, as it lies between the industrial West Europe and the agricultural East Europe and midway between the Baltic and the Adriatic sea. From the point of view of location, it has an industrial and commercial nodality. The great physical drawback of the country is that it has no sea-port and depends on foreign ports.

Approximately, 42 p.c. of the lands is arable, 31 p.c. is forest and 15 p.c. is pasture. Fertile soil, a plentiful supply of streams

and rivers and irrigation works permit cultivation of wheat, rye, barley, sugar beet and potato on a large scale through co-operatives the characteristics of which are as follows (*i*) combination of farmers for work in common for harvesting and soil preparation, (*ii*) the fields are joined into plots for cultivation in common ; (*iii*) crops and livestock are worked in common ; and (*iv*) payment is made on the basis of work done. About 50 p.c. of all farm land is under collective farms, and another 10 p.c. under state farms. The forest resources of the country are considerable, and industries like matches, paper, toys, packing-case, musical instruments and barrels are dependent on their timber.

Coal is found in abundance in Moravia, Bohemia and Slovakia. The chief coal fields are Chomutoc, Teplice and Sokolov. Coal production is between 90 and 96 million tons consisting of hard coal and lignite. There is also a small output of zinc, copper, gold and silver. In the mountains of Slovakia tin, nickel, manganese and copper are found. The oil-fields are also of growing importance.

Czechoslovakia is a great manufacturing country and some of her products have international reputation. The economic life and the national prosperity of the country rest on the manufacturing industries. The manufactures may be broadly divided into three groups: (*i*) those which obtain their raw materials in the country itself, such as sugar, alcohol, porcelain, glass-making, etc. ; (*ii*) industries which depend partially on raw materials at home, such as metal industries, chemicals and leathers ; (*iii*) industries which depend entirely on foreign countries for raw materials, such as textiles, etc. The industrial production consists of pig iron, crude steel, paper, cement, cotton textiles and woollen goods.

As the country has no sea-port of its own the natural lines of communication are by the Danube, Elbe and Oder. Minerals and metals, machinery, chemicals, food-stuffs and raw materials are the principal imports. Exports consist of motor cycles, linen fabrics, motor cars, electric motors, footwear and silk fabrics. About 40 p.c. of the trade is with U.S.S.R. Although small, India's share is on the increase. East Germany occupies the second place with about 11 p.c. of the share.

Numerous cities have developed in the country because of he diversity of geographic regions which require that each egion must serve its own economic interests. *Prague (Praha)*, he capital, is the chief industrial centre. It is also a great ailway town. *Brunn (Brno)* is an important manufacturing own. It has large paper, match and leather works. Pilsen (Plzen) has breweries, engineering and metallurgical works. *Ostrava* is the centre of glass industry. *Zlin* is a noted centre of leather works.

Rumania

The Republic of Rumania, a country of south-eastern Europe, has an area 237,000 square km. with 20 million population (1970).

The country is one of the richest European countries from the standpoint of developed and under-developed resources. Only 19 per cent of the population today makes their living from industry.

The State allots large fund for the technical and economic improvement of agriculture. Land is cultivated for wheat and maize in the low plains to the east and west of Transylvania. umania is one of the important wheat-producing areas in urope. Sugar beet, tobacco, maize and grapes are the secondary crops.

Rumania possessed a varied list of minerals of which petroum, gold, copper, lead, manganese, silver, zinc and antimony re important. Petroleum wells are worked in the Prahava alley, Moldavia, Oltenia and the Pitesti areas which produce nnually more than 13 million tons of petroleum and have e Rumania one of the great oil-producing countries of the orld, being second in Europe, after U.S.S.R. A pipe-line from hese oil-fields goes to the port Constanta on the Black Sea. ron-ore, coal, natural gas are worked, and the output is ncreasing.

In the development of industry, mechanical engineering, netallurgy and chemicals are the most important. The other products are glass, wine and paper. As a result of her rapid ndustrialisation, the production of consumer goods are ncreased considerably, specially textile fabrics, radio sets, T.V.

sets, refrigerators, footwear, sugar and washing machines. The principal exports are electric motors, window glass, petroleum products, tractors, cereals and wood. Of her total exports, about 45 per cent is received by U.S.S.R. The other chief buyers are East and West Germany, Czechoslovakia, Italy, Hungary and Austria.

Bucharest is the capital and the chief railway centre. It is located in the northern part of the country on the Steppes of Wallachia. In size and development, Bucharest is perhaps the most important city in the Balkan region. It has a population of a little more than one million. *Golatz* (Galati) is the chief river port, situated on the Danube and is engaged in the export of wheat and oil. *Constanta,* on the Black Sea, is the chief port of the country.

Poland

The Republic of Poland has an area of 312,000 square km. with 33 million population (1970). About 70 per cent of the people are Polish, and the rest are Ukrainians, White Russian and Jews.

It is essentially a flat country. Poland has no natural frontier excepting the Pripet Marches on the east and the Carpathians on the south. The climate is on the whole continental. Except in winter when frozen, the rivers are navigable and provide 4500 km. of waterways. The rivers are the Vistula, Warta, Netze and Bug.

The principal crops are wheat, rye, barley, oats and potatoes. Rye and potatoes occupy more than half of the total cultivated area. The forests, which are the property of the State, cover more than one-fourth of the land. Forests are mainly deciduous, with oak, chestnut, elm, ash and maple. The forests supply plywood and timber for building purposes.

Although the country is very rich in minerals, only 15 per cent of the total population are engaged in mining. Upper Silesia produces annually more than 100 million tons of coal of good quality. The Galician oil-field at the foot of the Carpathians yields about 300,000 tons of petroleum a year. Zinc and salt are also found. Upper Silesia raises lead and iron ore. The other minerals are lead, salt and natural gas.

Poland is one of the leading industrial centres of eastern urope. The manufacturing industries have developed in odz, Bydgoszez, Silesian coal-field, Bailystok, and Warsaw. The rincipal manufacturing industries are iron and steel, engineer- ıg products, textiles, chemicals, ceramics, sugar and paper. ıew industries are automobiles, tractors, heavy machinery, ıipbuilding and aircraft. Key industries have been nationa- sed and work under a planned economy. The exports of 'oland consist of machine tool, rolled metal goods, ships, oods wagon, coal, meat products, sugar, saw mill products, uel oils, boats, leather footwear and cotton and woollen abrics. About two-thirds of exports and imports are with ommunist countries. About 50 p.c. of the imports come from J.S.S R., East Germany and Czechoslovakia. So far as exports re concerned 35 p.c. are sent to U.S.S.R. The main imports re iron ore, petroleum, fertilisers, cotton and wool. *Lodz* is an mportant cotton-manufacturing centre. Heavy metal industries rc mainly concentrated in Upper Silesia. *Warsaw* is one of the ldest and most important towns of Poland. From this great ity roads and railways radiate in all directions. *Ghynia* is ituated on the Gulf of Danzig, a little west of the mouth of he Vistula. It lies outside the territory of Danzig and the 'ason for its development was Poland's dissatisfaction with the stablishment of Danzig as a free city which did not meet her equirements. *Danzig* is advantageously situated with respect o the Vistula river, which drains the heart of Poland. It has bout 260,000 population.

Finland

Finland is bounded by the U.S.S.R. on the east, the Baltic Sea on the south, Sweden and Norway on the west and he Arctic Ocean on the north. The geographical location and he historical function has made it a bridge and a meeting place etween Norway, Sweden and Soviet Union. It has an area of 37,000 sq. km with 4.7 million population most of which is oncentrated in the southern provinces. The Finns are to erive a living from a land which consists of lakes and swamps nd soil more suited to forests than to agriculture. Long inters and a short growing season are also problems for agri- ulture accounting for low productivity. Agriculture is one of

the chief occupations of the people though only 20 p.c. of the people are engaged in it. The principal crops are wheat, oats, rye and barley. More than 68 per cent of the land is covered by forests; the chief trees are the fir, pine, maple, ash and oak. Her great wealth of timber is the most important factor in the industrial development. Industry is almost entirely based forest products. The forest products are paper, newsprint, cellulose, mechanical pulp and cardboard. *Finland is now the largest supplier of plywood in the world.* Agriculture and dairying are the two important occupations. Fishing is of growing importance: it is favoured by the existence of many good harbours and an indented coast-line. The unusual freshness of the Baltic around Gulf of Finland from salinity is a great factor in the fishing industry. Copper, nickel, lead, iron ore, titanium, silver and gold are found in small quantities. The mining industry is as yet young. The varied character natural resources with their limitations are responsible fo changing the relative importance of occupations from time time. More than 50 p.c. of the people engaged in industry live in rural areas, and the percentage of women in industry is also relatively high. Finland is an exporter of round wood, plywood, lumber, paper and paper board, and metal and neering products. The largest buyers are West Germany, U.K., U.S.S.R., Sweden, France, U.S.A. and Belgium. About 20 p.c. of total imports come from West Germany, 10 p.c. from U.K., 20 p.c. from U.S.S.R., and 12 p.c. from Sweden. The principal imports are petroleum, base metals, machinery, textiles, and cereals. Most of the cities are located in the southern coastal areas. The Gulf of Bothnia coast has no big city. *Helsinki*, the capital, is a port and a manufacturing centre. *Viborg* an important port noted for the export of timber. *Turku* is shipping centre.

Greece

Greece is the most easterly mountainous peninsula stretching southward into the Mediterranean, together with Crete and numerous islands in the Ægean and Ionian Seas. No part of the country is more than 80 miles away from the sea. The total area of the country is 132,000 square km with 9 million population.

Greece is an agricultural country and about 50 p.c. of the ırking population are engaged in it. The scarcity of rain in ɛ summer has led to a concentration on deep-rooted, drought- ıisting plants such as olives, grapes and tobacco. In addition, soil is poor, not least owing to centuries of mismanage- ɛnt: soil-exhausting methods of cultivation and the erosion used by lack of water control, overgrazing, deforestation and ploughing of hillsides. Grapes are extensively cultivated. *ɛece is the leading exporter of currants in the world.* Greece half of her grape production for making wine, one-fourth ɪ making raisins and currants and the rest as fresh fruit. The her crops are wheat, cotton, rice, olives and tobacco.

The mineral deposits are not numerous but most of them ıve not yet been commercially exploited. The chief minerals e salt, lead, marble and iron ore. Zinc, copper, silver and ıtimony are also found. In 1963, as a result of 25 years of ɛploration, petroleum was discovered in West Central Greece.

Manufacturing industries include woollen and cotton weav- ıg and spinning, the production of wine, olive oil and chemi- products. Cigars and cigarettes are also manufactured. Vines, tobacco and fruits are exported in large quantities. As ıe country is not self-sufficient, she must exchange her exports · food supplies and capital goods. Recently, the country has roduced steel ingots and castings.

Sea commerce is of vital importance to Greece. Normally, bout 92% of exports and 90% of imports are seaborne. The ırgest proportion of imports comes from U.S.A., followed by J.K., West Germany and Italy.

Athens is the capital. Its chief port is *Piraeus. Salonika* is he most important trade centre of Greece. It is also one of he chief ports of southern Europe. It is connected by railways vith the important towns of the Balkans. It exports grain, ınimal products and tobacco, and imports textiles and iron oods. Other important trade centres are *Larissa, Stavros, Alexandropolis, Kalabaka* and *Katakolon.*

Spain

Spain has an area of 493,000 square km. The excellent ituation for commerce, the high fertility of the land and the

vast mineral resources are not yet effective for industrial development because of certain drawbacks. Her iron deposits are vast but the development of coal mining started late. The character of the coast-line does not permit easy construction of sheltered harbours. The country is mountainous; the difficulty of building roads and railways is considerable. Rivers are swift and have rapids and falls. One-third of the country has a mean annual rainfall which is inadequate for cultivation. The country has only 18,000 km. of railway lines. Industrial production and trade in agricultural products are badly handicapped by the unsatisfactory state of transport, especially railways. Road transport is not yet in a position to make up the deficiencies of the railway system.

The area of land devoted to agriculture is less than 40 per cent of the total area, and only 7 per cent of cultivated land is irrigated. Because of the general aridity, 90 p.c. of the cultivated land is suitable only for dry farming, and on most of it, the range of crops must remain strictly limited. The fundamental object of Spanish national plans has been to raise the standard of living by overcoming the insufficiency of rainfall.

The total population in Spain in 1970 was 33 millions. Nearly one-fourth of the population is engaged in agriculture. Spain has a rich and varied agriculture, the main products being wheat, rice and fruits.[14] Wheat represents an average 25 p.c., by value, of the total agricultural production. In the south and north-east, olives predominate. Vines are important in the south. Spain ranks high in the world in the production of cork, and in the export of oranges. Cattle, sheep, horses and pigs are reared and Spain has always been famous for the wool of its merino sheep.

Iron ore, manganese, zinc, lead, coal, copper, mercury, silver, etc. are found. *It ranks third in Europe in the production of lead, second in lead ore, first in mercury in the world, and among the leaders in zinc and silver in Europe.* Spain is one of the oldest iron-mining regions of the world. Its iron ore production in 1969 was 6 million tons. Spain provides

[14] The citrus fruits of Spain have a ready market in the West European countries in spite of the competition from Italy. However, unless Spain finds some way of associating with the European Common Market her trade in citrus may be adversely affected.

about 30 per cent of the world's output of mercury. Hydro-electric power has been developed in the Pyreness.

The essential feature of Spanish industry is the lack of balance in its structure. The basic industries and the transport system cannot sustain the growth of manufacturing industries. However, Spain is the third largest wine-producing country in the world. The other manufactures are textiles, wine, hides and skins, and dairy produce.

The principal exports are fruit, iron, cork, wool, olive oil, wine and textiles. The buyers are mainly U.S.A., U.K., France and West Germany. The imports include machinery, textile goods and food products.

Madrid is the capital. It is the principal railway centre. *Barcelona* on the Mediterranean coast, is the largest city and the premier port of Spain. It is a great industrial centre. The other trade centres are Valencia, Malaga, Bilbao and Cadiz.

Portugal

Portugal is a small maritime country to the west of Spain, with an area of 89,000 square km. Its population in 1970 was 9.6 millions. The main industry of the country is agriculture and 60 per cent of the inhabitants are engaged in it. Agricultural production is insufficient to cover the needs of the population. Portugal has to import food products to meet the deficit. Lemons, figs, oranges, apples, almonds, dates and nuts are extensively grown. Wine is made throughout the country.

The country has a variety of minerals. Coal, kaolin, iron and wolfram are worked, the deposits of wolfram being the most important in Europe. Copper, lead and salt are also obtained in small quantities.

Forests of Portugal are especially important for oak from which cork is obtained. Portugal ranks first in the world in the production of cork and it is one of the country's biggest export revenue earners. Well over half the world's cork requirements are met by Portugal, which exports 80 to 90 p.c. of its production. The production of cork is on the decline and that of resin on the increase. Forests occupy about 19 per cent of the total area of the country.

The manufacturing industries are mostly those connected with the preparation of products obtained from vines and olives. There are also considerable woollen, cotton and linen industries. *A characteristic occupation of the Portuguese is the manufacture of porcelain tiles, an industry inherited from the Moors.* The tourist industry is growing fast and about 2 million foreign visitors come every year, and provide a major source of foreign exchange earnings.

The principal exports of the country are cork, wine, olive oil, resin, turpentine, pyrites, wolfram and sardine fish. The important buyers are U.K., West Germany, U.S.A. and France.

Lisbon is the capital and chief port. It has magnificent harbour. It is connected by rail with Madrid and Oporto. Agricultural products are exported and manufactured goods imported through Lisbon. *Oporto* is the chief port through which wine is exported.

Bulgaria

Bulgaria lies to the south of the lower Danube and occupies the eastern part of the Balkan Peninsula. It has a land area of 110,584 sq km.

Bulgaria has not developed its industry very much. The whole of the country's industry is under national ownership and control and there is hardly any private sector. Its socialised economy embraces 89 p.c. of industry, 95 p.c. of agricultural and 99 p.c. of retail trade. It possesses considerable mineral wealth. Deposits of copper, manganese, oil, coal, lead, zinc, marble and granite exist.

Bulgaria's largest forests are in the Rila, Rhodopes, Pirin and Balkan mountains. Deciduous constitute about 80 p.c. of the forest and the rest are coniferous. Oak, beech and other deciduous trees, which are extensively found in the mountainous parts of the country, provide timber for export. The production of silk cocoons is an important industry.

Agriculture is the main occupation of the people. More than 80 per cent of the people depend directly on agriculture which is favoured by fertile soil and favourable climate. Wheat, maize, barley, tobacco, sugar-beet, vines and fruits are

important. Cotton and oats are also grown. The cultivation of roses for the manufacture of scent is followed on the hill slopes of the Balkan mountains. The vale of Kazanlik is one of the important rose-growing areas. Cotton mills, chemical works and power plants are in operation today. At Dimitrova, a blast furnace has been set up.

The sea-outlets are (*i*) Sofia to Varna, on the Black Sea, along the northern side of the Balkan mountains ; (*ii*) Plovdiv to Burgas, on the Black Sea, along the southern side of the Balkan mountains ; (*iii*) Maritza Valley to Dede Agach, the nearest port to Bulgaria.

The exports are raw tobacco, clothing, jams and jellies, cigarettes, and timber. Raw cotton, cotton textiles, tractors, wheat and petroleum products are the principal imports.

The principal trade centres are *Burgas, Varna, Sofia* and *Plovdiv.* Varna (Stalin) and Burgas, on the Black Sea, export tobacco, eggs, *attar* of roses, maize and silk. The capital of Bulgaria is *Sofia.* It is the largest town in the country.

Albania

The Republic of Albania has an area of about 28,748 square km. It has a population of 2 million (1970). The country is situated on the Adriatic, between Yugoslavia and Greece. The location opposite and close to Italy gives the country a strategic importance at the entrance of the Adriatic Sea. Excepting the coastal area, the country is mountainous. The forests in the mountainous regions contain oak, walnut, chestnut, beech, pine and fir. The principal crops are maize and wheat, the former occupying 58 p.c. of the cultivated land. Tobacco, sugar beet and dairy products are also important.

The extent of mineral resources of Albania is still unknown. The main oilfield is at Kucove near Berat which is connected with the port of Vlone. Copper mines in the Puke district and saltpits at Vlone are also being worked. The exports are citrus fruits, wine, unmanufactured tobacco and copper. *Tirana,* the capital, is centrally situated just on the inland edge of the main coastal plain. *Scutari* is the largest town and stands on the plain surrounding Lake Scutari. It is noted for melons. *Durazzo* is the chief port.

QUESTIONS

1. In what part of Great Britain are all branches of the woollen industry most largely situated ? Point out the local conditions favourable to it there and name three of the chief towns engaged in the industry.
2. Consider the position of France with regard to her supplies of (*a*) fuel and (*b*) water-power.
3. Name the three principal manufacturing industries of Great Britain and give reasons for their location.
4. Describe the position of the principal coal-fields of Germany particularly as regards access to navigable waterways. Also name the chief manufacturing industries of these coal-fields.
5. Give an idea of coal and iron regions of Europe, and the industries which have been established there. (Cal. Inter. 1953)
6. Describe and account for the distribution of population in Europe (Delhi B. Com. 1968)
7. Examine the coal resources of Great Britain and show how they have helped the development of her industries.
8. Discuss the geographical factors influencing the growth of Britain's prosperity and trade. Do you think Britain can still count on those factors ?
9. Discuss in detail the role of inland waterways of Europe in the economic progress of the continent. (Delhi B. Com. 1968)
10. Make a critical assessment of the mineral resources of (*a*) U.K. and (*b*) West Germany. (Delhi B. Com. 1969)
11. What are the agricultural commodities of which Soviet Russia is the leading producer in the world ? In what part of Soviet Russia are these produced? Briefly describe the special fetaures of Soviet agriculture. (Cal. B. Com. 1958)
12. "Self-sufficiency is the keynote of the economy of the U.S.S.R." Discuss the statement with reference to the principal agricultural, mineral and industrial products of Soviet Russia. (Cal. B. Com. 1957)
13. Write an account of the soil and climatic conditions in the different agricultural regions of the Soviet Union and the chief agricultural products in each. (Cal. B. Com. 1960)
14. What countries of Europe are industrially less developed ? Give your reasons for their slow development.
15. Describe the distribution and production of petroleum in U.S.S.R. (Delhi B. Com. 1961)

CHAPTER XI

NORTH AND CENTRAL AMERICA[1]

North America is the third largest continent and embraces nearly one-seventh of the land surface of the globe. It has an area of 9 million square miles with a population of more than 260 millions. This means that the continent has 8 p.c. of the world's population in about 12 p.c. of the world's land area. The highest densities of population are in the north-eastern U.S.A. and south-eastern Canada. The continent almost touches Asia in the north-west and comes nearest to Europe in the north-east. The situation is ideal for commerce inasmuch as both Europe and Asia can be approached conveniently by waterways. The trade with Asia has been further helped by the construction of the Panama Canal. Politically, the continent consists of Canada, U.S.A., Mexico, Central America (Costa Rica, Guatemala, Honduras, Salvador and Panama), and West Indies (Cuba, Jamaica, Haiti, San Dominico, and Puerto Rico). North America has a variety of climate which accounts for the growth of agricultural products like wheat, cotton, tobacco, sugar-beet, sugar-cane, rice, hemp, maize, etc. There are well-defined agricultural belts which reflect the patterns of physical and economic facts.

North America has deposits of coal, petroleum, iron ore, tungsten, vanadium, cobalt and molybdenum. Of all the continents, North America is most fortunate in having relatively a large share of the world's mineral resources, particularly in coal, iron ore and petroleum. More than 52 p.c. of the known coal reserves of the world are in this continent. Practically, the entire production of anthracite coal of the world comes from the U.S.A. About 12 p.c. of the world's iron ore

[1] Statistics and data are from the Statesman Year Book, 1971-72; Production Year Book, 1970 FAO; Trade Year Book, FAO 1970, and Statistical Year Book, UNO 1971; For selected readings, see Mighell, R. L. American Agriculture, its Structure and Place in the Economy; Smith and Philips, North America; Jones and Bysan, North America; Currie, A. W. Economic Geography of Canada; Brown, W. A., The United States and the Restoration of World Trade; Glover, J. G., The Development of American Industries.

reserves are in North America. The continent is well-supplied with oil, and the U.S.A. produces annually about 20 p.c. of the world's petroleum. The North America's share in the world production of some selected minerals were as follows in 1969: Coal 20 p.c., iron ore 30 p.c., bauxite 40 p.c., nickel 98 p.c. and petroleum 26 p.c.

Canada

The Dominion of Canada is the largest country in the Western Hemisphere and consists of twelve provinces; Nova Scotia, New Brunswick, Prince Edward Island, Quebec, Ontario, Newfoundland, Manitoba, Saskatchewan, Alberta, British Columbia, the North-West Territories and the Yukon. The area of the country is 3.5 million square km. and its population was 21 millions in 1970. In spite of the large size of the Dominion, many parts are not suitable for settlement because of unfavourable climate, relief and soil. Yukon and the N. W. Territories have very little scope for development. The population of Canada is practically concentrated in a fairly narrow zone, bordering the U.S.A. The lowlands lying between the lakes of Erie and Ontario and the St. Lawrence river on the south and the Laurentian shield on the north contain about 50 per cent of the total population of Canada. The greatest density is found in Ontario along the northern shore of both lakes and along the Laurentian lowland of Quebec. Nearly half the population live in the seventy towns of Quebec and Ontario.

Economic Resources and Industries

The natural resources of Canada are very great. In agriculture, mining, lumbering, fishing and ranching it occupies the most important position in the British Commonwealth.

Fishery Resources. Fishing is an important industry of Canada, which is carried on in the Atlantic, Pacific and in her inland lakes and rivers. The fishery resources are well-known for their scope and abundance. The variety consists of demersal, pelagic and numerous shell-fishes. Newfoundland, Nova Scotia, New Brunswick, Prince Edward Island and Quebec are engaged in the Atlantic fisheries. In the Pacific

coast, British Columbia is the only state to participate in fisheries. The inland fisheries take place in the Great lakes and other lakes. Cod, halibut, haddock, sardines, and herring are the chief catches. On the Atlantic coast also is found the lobster fishery—much the largest in the world. On the Pacific coast, river fisheries are very important; in that region salmon is caught in Fraser, Columbia and Skeena rivers. This region is one of the world's big salmon fisheries with catches sometimes running to as much as 190 million lbs. in a year. Some valuable sea fisheries include herring, cod and halibut on the Pacific side, where Prince Rupert is the chief centre. The rivers and the great lakes of Canada also contain fish which are mostly consumed in the country. The number of persons employed in the fishing industry is more than 78,000. Canada produces fish three times as much as she can absorb in her domestic markets. Consequently the development of foreign markets for her fish is a matter of outstanding importance. The principal kinds of fish are salmon, lobster, cod, herring, haddock, white fish, halibut and sardines.[2]

Canadian Agriculture. There has been a great expansion of agricultural output in Canada in recent years. The factors responsible for the expansion are the high level of prices of farm products, rapid rate of mechanization in farm operations, increased research in processing and preservation of foods and plentiful supply of fertilizers. The extension of railways has also greatly facilitated the cultivation of crops in the arable lands. Agriculture employs about 10 p.c. of the total gainfully occupied population.

The main wheat belt of Canada is about 326 km wide and 1000 km long and stretches diagonally across the southern parts of Manitoba, Saskatchewan and Alberta. About four-sixths of Canadian wheat is grown in Saskatchewan. The next important province is Alberta which grows only one-fourth of that in Saskatchewan. Manitoba grows between 10 and 12 p.c. of

[2] A new problem for Canada's fishing industry has arisen with the active interest of the Russian fishermen in the British Columbia coast—outside 12-mile coastal limit. The Dominion government is unable to do anything because the Russians are perfectly within their rights as they do fishing outside the 12-mile coastal limit; and secondly, the U.S. fishermen have fished these waters for more than 50 years and thus have created precedents.

Canadian produce. Wheat is grown on a very large scale in Canada and labour-saving devices greatly reduce the cost of production and handling. The stabilisation of prices, grading and supply are generally controlled by the *Canadian Wheat Board.* Canada raises about 20 million tons a year. Annual production of wheat is more than her requirements for domestic use, and this surplus of production over requirements has made Canada one of the leading wheat-exporting countries of the world. The wheat centres are Port Arthur, Fort William, Winnipeg and Montreal. Oats are raised mainly in Saskatchewan, Alberta, Ontario, Quebec and Manitoba. The most important province for barley is Alberta which contributes two-thirds of the total production. Soyabeans are cultivated only in the province of Quebec. Of late, the outstanding agricultural development has been the rapid and pronounced expansion in the production of livestock and livestock products to meet the unprecedented export and domestic demand.

Minerals and Water Power. Canada has reached the position where it is one of the leading producers of minerals. In some respects it is the most unique of all mining countries. In 1968, in terms of volume, she was first in each of the following in the world ; nickel, zinc, asbestos and silver, second in each of the following : gold, lead, sulphur, uranium and molybdenum ; third in platinum group and fourth in copper and iron ore. Her minerals are vital not only to the North American continent but to the rest of the world also.

Nova Scotia, British Columbia, Quebec, Ontario, Alberta and Yukon Territory are the chief mining districts. *Canada is the second largest producer of gold in the world and contributes 9 per cent of the world's total.* The chief gold-areas are British Columbia, Klondike district of the Yukon Territory, Nova Scotia, Ontario and Quebec. Gold production has maintained an almost uniform annual rate of production between 1948 and 1970. *The most valuable nickel mines in the world are at Sudbury in Ontario, which supply 60 per cent of the world's total.* There are about 40 nickel mines at Sudbury in an area 40 miles long and 15 miles wide. It is interesting to note that Canada used to contribute 96 p.c. of world's total in 1948. U.S.S.R. and New Caledonia have recently become important producers of nickel. Copper is a

valuable mineral which is worked mainly in Ontario, Quebec and British Columbia. Another mineral, of which Canada supplies 60 per cent of the world's total, is asbestos, mined in Quebec. Canada raises 1·2 million tons of asbestos compared to world's total of 2 million tons. Silver, zinc, lead and cobalt

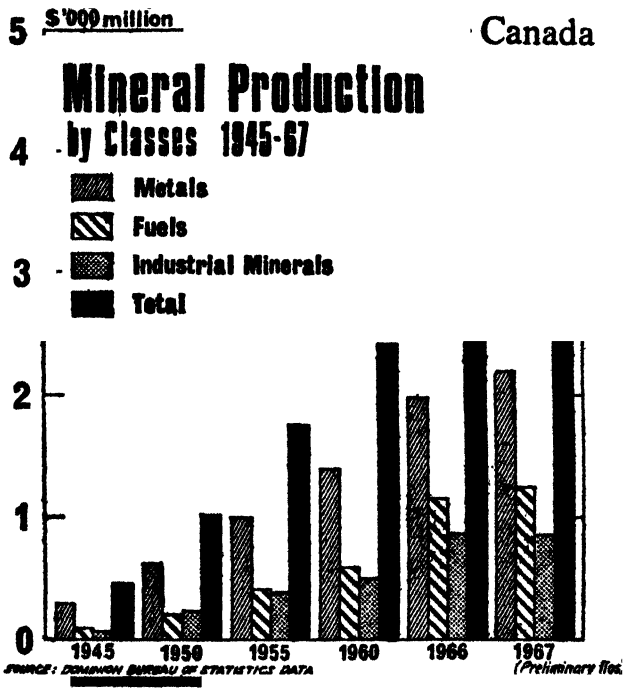


FIG. No. 67. Mineral Production—Canada

are the other minerals. Zinc is available in Quebec and Burnswick. In its production, Canada occupies the first place with about 20 p.c. of the world's total. Her sulphur production is high and it is exported to Japan, Australia and Soviet Union. Rich deposits of titanium near the St. Lawrence and of uranium in Saskatchewan and the N. W. Territory promise great things, both directly in wealth, and indirectly by facilitating bigger population in areas, now barren. Iron-ore regions are mostly found in Texada, Ontario, Nova Scotia, Alberta, Saskatchewan, Rocky mountains and Vancouver Islands. Canada raised about 10 million tons of coal in 1969. The coal-fields

of Nova Scotia alone furnish about 40 per cent of Canadian output. There is also a vast new iron field in the barren Ungara region between Quebec and Labrador. Crude oil and natural gas are obtained from Alberta at Medicine Hat and the Mackenzie basin.[3] In 1969 Canada produced about 54 million tons of crude petroleum as against only 4 million tons

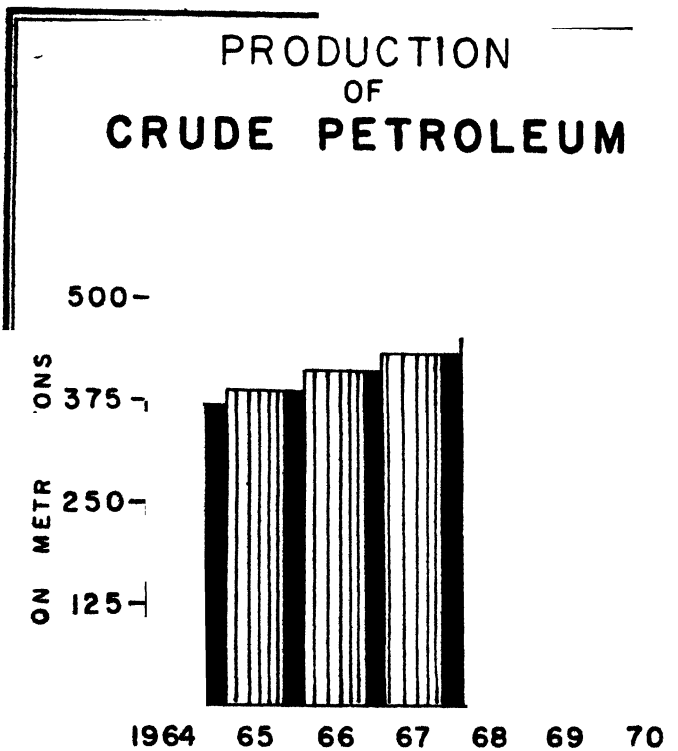


FIG. No. 68. Production of Crude Petroleum

in 1950. A big oilfield has been discovered in Alberta. There is a 1,750 mile pipeline from the oilfields in the Edmonton area to Superior on the Great Lakes for supplying oil. It is the longest pipeline in the world. Another pipeline from the Alberta to California carries gas.

[3] The oilfields of Alberta seem destined to revolutionise conditions, industrially and strategically, throughout the already agriculturally rich Western Praire zone of North America.

Forests and Forest Products

Nearly 48 per cent of the total land are of Canada is rested, and in all these, except in the north where movement difficult, lumbering is an important industry. *Canada ranks mong the greatest exporters of timber in the world.* It is the nly country in the British Commonwealth with a large export- ble surplus of construction lumber. More than one-half of anada's lumber is supplied by British Columbia where the redominating species are Douglas Fir, Hemlock, Spruce, Red dar and Pine.[4] Structural timbers are obtained from the ines and hemlock, while cedar is important for exterior work. pruce is used for pulp in paper-making, and is the most nportant soft wood.

The northern forest belt is commercially important on the astern side, especially in Quebec and Newfoundland. The umbering industry is favoured in Eastern Canada by a multi- de of rivers, the very severe winters and floods in spring when e thaw comes. The timber is cut in winter and is easily agged over the snow and ice by horses to the nearest conve- ent stream. The trees are bound together to form a raft and hen the stream thaws the rafts are floated down the stream to ie saw mills. The conservation of forests is strictly maintained Canada. No one is allowed to cut timber without licence, nd young trees are protected. The fire protection services aintain watch-towers for reporting the outbreak of fires. The eat northern forests also give refuge to many fur-bearing nimals.

Forest industries of Canada can be divided into wood erations, the lumber industry and the manufacture of pulp nd paper. Wood operations, that is logging, are important Eastern Canada and Br. Columbia. The economic develop- ent of Canada has been very much influenced by lumbering. he buyers of Canadian lumber are, in order of importance, .K., U.S.A., Netherlands, Union of South Africa and Australia.

[4] In 1881 British Columbia was considered a land of cold mountains t worth keeping because of physical barriers. Today, British Columbia a trading nation with development of her vast resources tied to World arkets. Products of British Columbian origin shipped to other countries talled a value of 1,542 million dollars in 1969.

Transportation : Canada is fortunate in having large nav gable waterways. St. Lawrence and the Great Lakes provi 2,000 miles of magnificent natural waterways to Canad although they are frozen during the winter months. Lar ocean vessels can pass about a thousand miles up the river S Lawrence to Montreal, where goods are transhipped to small vessels. Navigation is rendered difficult at the mouth of t St. Lawrence because of constant fogs and the rapidity of t current. The volume of traffic along the river and the la route into the heart of the continent is immense. During t shipping season vast quantities of grain, ores and forest pr ducts make long voyages down the St. Lawrence to the po of the east coast, whence they are shipped to all parts of t world. Upstream go cargoes of motor cars and many oth manufactured goods. The importance of this waterway will realised when one notes that over 60 p.c. of Canada's pop tion is concentrated in Quebec and Ontario along this wa way. St. Lawrence has already become a great seaway.

The progress of Canada is the result of a great devel ment of the railways, particularly in the west and north-we Rail transportation is the main co-ordinating factor forming background for all the accomplishments of production. Can has now two great railway systems: (*i*) the Canadian Paci Railways, and (*ii*) the Canadian National Railways. E system has a trans-continental line and network of innum able branch lines which have played a great role in opening the agricultural areas of the west. The railways of the D nion are connected with those of the U.S.A. The total railw mileage in Canada in 1969 was 58,000. Canada has a very w organised air service to serve the continent.

The Manufactures and Industrial Regions

The manufacturing industries are rapidly developing. increase of agricultural population, extension of railwa mineral wealth, supplies of water-power and the large produ from agriculture and forests have made Canada a great trial country. Already her manufactured products far ex in value the unmanufactured farm products. Though imports from abroad some of her requirements in

aterials, farming machines, iron and steel goods and textiles, et progress in industrialisation is keeping the country less ependent. Canada's vast natural resources give rise to indus-ries like metal, machinery, chemicals, textiles, fish-canning, lour-milling, butter and cheese making, saw-milling and paper-naking. Manufactures of iron and steel goods is of recent levelopment. Pulp and paper industry in Canada is due to eadily accessible resources of wood of superior quality for the nanufacture of both paper and rayon, and to well-distributed water-power and supplies of clean, fresh water.

The main feature of the Canadian industry is that its products are mostly made for internal market. Also, there are too many concerns for a few types of goods. The Canadian steel industry is firmly established, and its production at present is around 9 million tons, compared to 2 million tons in 1948. The increased output is being absorbed by developing new markets within the country, by reducing imports and by increas-ing exports. The production of pulp and paper is the key ctor in Canadian economy with about one-sixth of the world tal. Canada accounts for 75 p.c. of all newsprint and 25 p.c. wood pulp moving in international trade.

The province of Ontario is the industrial heartland of anada. The entire production of automobiles, 90 p.c. of eavy electrical machinery, 53 p.c. of aircrafts, 77 p.c. of steel id 76 p.c. of the tele-communication equipment of the country e manufactured in Ontario.

Commerce and Trade. Though so sparsely inhabited, anada ranks fourth, in terms of volume, among the world's ading nations, and per capita enjoys a bigger foreign trade lan any other country.

Newsprint paper, wood pulp, wheat, nickel, asbestos, fish, ilver, gold, copper, vehicles, farm implements and fertilizers re the chief exports. The principal imports are iron and steel ds, petroleum, electrical apparatus, automobile parts, farm nplements, fruits, coal, automobiles, rolling mill products etc. here has been a change for some years in the direction of nada's foreign trade: it has become more North American. t present the U.S.A. has the largest share in the foreign trade Canada. This is because the Canadians largely employ

American machinery and adopt American techniques in mining agriculture and industry; also, the Canadian consumers have much the same taste as American consumers. Of total Canadian imports of $ 9867 million, U.S.A. supplied goods worth $ 8021 million in 1966.

SHARE OF CANADA'S EXPORTS, 1969

(In $ million)

U.S.A. ...	10,215	U.S.S.R.	9
U.K.	1,096	South Africa ...	79
Germany (W) ...	277	India	96
Belgium	116	China (Mainland) ...	122
Japan	624		

In 1970, U.S.A. took 65 p.c. of Canada's exports and in 1969, it was 70 p.c. The U.S.A. owns 60 p.c. of Canada's manufacturing industry. With a few differences, Canada's industrial problems are the same as in the U.S.A.

Canada has been very much concerned by the entry of Britain in 1972 to EEC as it fears that there will be protectionism both inside and outside Europe by the enlargement of European Economic Community. Canada has the vexed question of foreign ownership of industry to solve. There is pressure to curb the powers of foreign companies by legislation.

Cities and Ports. 25 p.c. of the total population of Canada live in eight cities of Montreal, Toronto, Hamilton, Ottawa, Quebec, Windsor, Vancouver and Winnipeg. The heaviest urban concentrations are in the provinces of Ontario, Quebec and British Columbia with 71, 67 and 61 p.c. of their respective population.

Halifax is the chief sea-port of Nova Scotia. It possesses a fine harbour and is seldom closed by ice during winter. The harbour is six miles long and one mile broad. It provides accommodation for large vessels. Although it is chiefly a trading centre exporting fish and minerals, a considerable progress in manufactures has taken place recently, especially in sugar refining and cotton-spinning. *Montreal* in Quebec, is the largest town in the Dominion. It is great in commerce, manufactures

ınd industries. *Toronto,* in Ontario, is a rival of Montreal. It s the most important lake port. *Ottawa,* in Ontario, is the apital of Canada. It is a river port and has considerable timber rade. It is the centre of the greatest system of water-power in he Dominion. *Vancouver,* in British Columbia, is an import- ınt port on the Pacific coast of Canada. It possesses an excel- ent harbour. Wheat, timber and minerals are the chief exports. n terms of total tonnage, it outstrips the western part of eattle, Portland, Sanfrancisco and Los Angeles combined. *Vinnipeg,* in Manitoba, is the seat of Provincial Government. It s the greatest wheat centre of the world.

The United States of America

The United States of America is a gigantic State of 3.5 nillion square miles of area with a population estimated at 205 million in 1970 and lies in the central part of the North American continent with the Atlantic Ocean to the east, the Pacific Ocean to the west, the Dominion of Canada to the north, ınd Mexico and Gulf of Mexico to the south. It is a federa- ion of fifty States.

Factors responsible for greatness : The United States of America in recent years has become the richest country in the world and in human history. *Social, economic* and *geographic forces combined to help the country attain industrial and political greatness.* The original colonists who came from Europe, had brought with them high culture, civilisation and commercial ideas which resulted in the development of a society in which the members had high achievement motivation. These immigrants and their descendants did not care for traditional and social beliefs of Europe, but gave their full energies for the pursuit of wealth. The vast possibilities of the country further created an ardent desire for prosperity and respect for individualism. Economic success had always been considered the main way to social distinction. "The philosophy of individualism found an especially congenial environment in this country. The relative scarcity of people tended to raise the social and economic importance of individuals".[5] Secondly,

[5] Williamson, H. F.: The Growth of the American Economy, Prentice Hall, New York, 1951, pp. 14-15.

the governmental system is a constitutional democracy with unique features of European heritage and special conditions of political life in the country. It draws its power indirectly from the great body of the people who may be advised and led but their will—if asserted—must be obeyed. In fact, nowhere else earlier a political democracy recognised the voice of people as an irrefutable moral force to a degree as in America. By maintaining the balance between liberty and law, and by providing sufficient financial stability of entrepreneurs and investors, the American democracy has been responsible for keeping the galvanic quality of American life. Thirdly, the earlier aloofness of the government and the people from internal wars and rivalries in Europe gave the country an opportunity to exploit its natural resources and to develop her country undisturbed. It has given up this policy of isolation now and has become a very powerful force in the world—politically and industrially. Its active interest in international affairs is from a desire to see that backward and developing countries can get rid of poverty, illiteracy and disease, and can live in peace in a democratic set-up. U.S. capital has been flowing overseas at a steadily increasing rate for manufacturing operations. The has been 500 p.c. increase in its industrial investment in Europe from 1950 to 1963. The political and business vision of th U.S.A. has truly become internationalised, and is a strong fac in inspiring many nations to make serious efforts for growth and progress.

Fourthly, the structure of American industry has been basis of her strength with large size, use of scientific manage ment, presence of managerial personnel and skilled labour. The speed of industrialisation got momentum from progress in port, development of technology and science, advances in machines and tools and superior utilisation of power. The other factors which have helped America to achieve industrial and commercial greatness are location and natural resources. The location of the U.S.A. is such that it includes the greater portio of the best parts of North America in respect of climate, pro duction and commerce and is provided with fertile plains the whole of the eastern side, and access to the oceans by th east, west and south. No country in the world is richer tha America in respect of natural resources. The country has

irplus of most essential foodstuffs ; she is well-equipped with inerals, and her agricultural lands are extensive.

Finally, there is good understanding between Government nd business in the U.S.A. In many areas of economic and ocial programmes, there is cooperation between Government gencies and business corporations. The Government truly elieves that the managerial skills of the large corporations epresent a national resource which can be harnessed to serve ational as well as corporate objectives.

Population Characteristics : The rapid growth of popuation in the U.S.A. is one of the most significant features of uman geography. In 1789, the population was about 4 illions ; it rose to 13 millions in 1830, and in 1860 it was 32 illions. By 1870 the population of U.S.A. was greater than hat of France, and in 1880 it surpassed Germany with 50 illion population. Between 1950 and 1960, the population inased by 18 millions. In 1968, the population was close to 0 millions. This raipd growth of population was also accomanied by an ever-increasing standard of living. The average lensity of population in U.S.A. is 50 persons per square mile ompared with 190 in France, 441 in Germany, 685 in England nd 712 in Belgium. In U.S.A. about 127 million people live n the eastern part where the density is 126 per square mile.

The Negroes form about one-tenth of the total population. he highest concentration of Negro population is in the outhern States of Mississippi, South Carolina, Louisiana, labama, Georgia, North Carolina, Arkansas, Virginia, Tenessee and Texas. The government policy is to make "the merican ideal of equality of opportunity a reality for every itizen regardless of his race, creed or colour."

Agricultural Products : The United States is the leading gricultural producer in the world. A century ago, 80 per cent the people depended on agriculture ; in 1900 it was 37 per ent, in 1944 it was only 20 per cent. At present only about per cent are engaged in agriculture. The land under cultivaion in 1966 was 311 million acres with a farm population of 1 millions. The total number of farms is 3 millions ; the verage size of a farm is 242 acres. Farming is a family enterrise in U.S.A. Even with an increase in population in the

country, a smaller number of farm population is today giving surplus production in many crops so as to enable the countr to help meet the food deficit of many countries. This is du to the higher degree of mechanisation and greater use of ferti lisers. Most of her needs are supplied by her agricultural lanc The country, however, must import rubber, coffee, suga banana and vegetable oils. In the case of rubber, recent pro gress in the production of synthetic rubber has rendered th country practically independent of the outside world. Ther are two types of farms—commercial and other farms. Com mercial farms adopt mechanisation and hired labour for large scale production. There are also commercial family farms.

Wheat is the principal crop of the country. The most pro ductive belt is where there is a light, early summer rainfall anc a hot semi-autumn. These conditions are found in Montana Washington, Idaho, Nebraska, Texas, Oklahoma, Kansas, North Dakota and Illinois. The California valley with its Mediterra nean climate is also suitable for growing wheat. Kansas is the leading wheat producing State in U.S.A. followed by Nebrask and Montana. It may be mentioned here that 70 p.c. of the exports of wheat from the U.S.A. are shipped under specia programmes and do not affect commercial transactions. The next important produce is maize. Although the area sown is far larger than the area under wheat, maize is not important for export, as most of it is either used as human food in the south or as fodder for stock of cattle. The maize crop requires rather a hot and wet summer ; so the maize belt lies to the south and east of the wheat belt. The middle Mississippi valley is very important for this crop ; it is produced in the states of Iowa, Illinois, Indiana, Missouri and Eastern Kansas. The markets are St. Louis, Kansas City and Chicago. Oat is used mostly for the manufacture of breakfast food. Cotton is grown in the south of the maize belt. Eastern Texas, with its rich, black prairie soil, is important for the growth of cotton. Texas grows about 25 p.c. of U.S.A. cotton. It is produced also in Arkansas, Alabama, Mississippi, Georgia and Carolina. Cotton production is most heavily concentrated in the lower Mississippi basin extending from about Memphis, Tennessee to Vicksburg. The cotton belt is moving west of the Mississippi river. Georgia and South Carolina grow "Sea-Island" cotton. *The U.S.A. produces*

25 to 30 per cent of the world's supply and Western Europe depends for 60 per cent of cotton on America. As a by-product cotton-seed is valuable, which is used either for the manufacture of oil or for cattle food. Recently, cotton cultivation has been introduced in New Mexico, Arizona and California with the help of irrigation. The tobacco regions are Kentucky, Virginia, North and South Carolina and Tennessee. The leading port of shipment is Richmond in Virginia. The U.S.A. produces about 20 per cent of the world's tobacco. The other minor crops are rice and cane-sugar.

Soyabean which was first introduced in U.S.A. in the mid-19th century from Asia, is an important crop today for human consumption and industrial requirements. It produces more than 26 million tons a year, out of the world total of 40 m tons.

Thus, American agriculture presents a pattern of geographical specialisation, which is conditioned by rainfall, agriculture, soil types and other factors. The agricultural productivity is, however, the result of both natural richness of land and the manner in which the farms are managed.

The Minerals

The minerals are the foundations on which the economy of the U.S.A. has been dependent to a large extent. From the point of view of value of output and of employment, mining is, however, less important than the manufactures in the U.S.A.

In the output of minerals the U.S.A. exceeds all other countries of the world. The chief mineral products are coal (anthracite 1/6, bituminous 5/6), petroleum, natural gas, salt, iron ore, silver, gold, copper, zinc, bauxite and lead. The U.S.A. produces more coal than the whole of Western Europe. The annual production of coal is more than 500 million tons consisting of bituminous and lignite. In addition, 18 million tons of anthracite coal were also raised. In 1969, the production was 560 million tons, raised in about 25 States. There are five important coal-producing areas in the U.S.A.

(*a*) The most important area is the Appalachians where bituminous coal-fields extend from Pennsylvania to Alabama. The area raises nearly three-quarters of the U.S.A. output of high-grade coal. The output in 1969 was 100 million tons.

(*b*) The second important area is confined to the *eastern interior* and includes Indiana, Kentucky and Illinois. Most of the coal from this area is poorer in quality than the coals of the Appalachian region. The output was 160 million tons in 1967.

(*c*) *The western interior* coal-field extends from Iowa through Kansas and Missouri to Oklahoma. Coal from this area played a very important part when the Middle West started industrialisation.

(*d*) The Gulf coal-fields extend from Southern Alabama to Texas. This coal is lignite.

(*e*) The coal-fields of Rocky Mountain area are scattered throughout the mountain States from Montana to New Mexico. Most of the coal-beds of the regions are in age younger than carboniferous and consist of low grade bituminous and lignite. But these mines are little developed on account of distance from the sea and industrial areas, the mountainous character of the relief and the sparse population. There are no big coal-fields on the Pacific coast. The coal is used by railways and ore smelters, and for local domestic heating.

The next mineral in importance is petroleum. The production, refining of petroleum products is one of the largest industries in the country, employing over 1 million people. It would have been difficult for the U.S.A. to attain its present motorised civilisation without petroleum. Fortunately, she is equally rich in petroleum as in coal. Although the U.S.A. oil production has been on the increase, its share in the world total production has declined. With more than 50 p.c. of the world production in 1948, it came down to about 25 p.c. in 1968, and 20 p.c. in 1970.

There are four oil-bearing areas:

(*a*) The most productive region extends from Kansas through Oklahoma and north-eastern Texas into Louisiana.

Texas and Lousiana raise more than 50 p.c. of the country's total oil output. California's share is about 12 p.c.

(*b*) The Appalachian belt includes an area from New York State to Kentucky. Its output is decreasing.

(*c*) Ohio, Indiana and Illinois, at one time large producers, do not at present yield much oil.

(*d*) The western belt includes California, Colorado, Montana and Wyoming.

The third mineral of importance is copper, which is found in the Rocky mountains. The greatest output is in Arizona, followed by Montana ; New Mexico is also important. Zinc is produced mostly in Missouri ; other states producing it are Kansas, Oklahoma, Montana, New Mexico and Wisconsin. The United States is the leading producer of copper in the world, and in 1967 she raised 1 million tons of recoverable content of copper ore.

Gold is found in California, Colorado, Arizona, New Mexico, Utah and Nevada. *Silver* comes from Arizona, Nevada, Colorado and Utah. Gold and silver are usually found in close association. The main silver-producing states are Idaho, Arizona, Utah and Montana. Black Hills district in South Dakota is the largest producer of gold in the U.S.A. The mines of the district were discovered in 1876. California, also known as "Golden State", has large deposits of gold on the western slope of the Sierra Nevada mountains and in Utah. *Iron ore* is obtained from Minnesota, Wisconsin and Michigan and is worked chiefly in *Chicago, Buffalo* and *Pittsburg*. The south-eastern region near Birmingham in Alabama has iron ore occurrences in hematite and limonite with 35 p.c. iron ore. In 1969 the U.S.A. produced about 90 million tons of iron ore and was second to the U.S.S.R.

The U.S.A. has been the leading supplier of *aluminium* in the world. She contributes about 50 p.c. of the world's total followed by U.S.S.R. which raises hardly 10 p.c. of the U.S.A. production. The ores are usually found in the south of the Appalachian mountains. The chief copper states are: Arizona, Utah, New Mexico, and Montana. As a supplier of non-ferrous metals like copper, lead, zinc, silver, gold and aluminium, the U.S.A. occupies a dominant position. She supplies about 40 p.c. of the world's copper, 25 p.c. of the lead ore, 30 p.c. of the zinc and one-fourth of the silver. In recent years she has also been the world's largest producer of each of these metals with the exception of gold, in spite of the fact that she suffers from certain very definite disadvantages. Her labour is dear, her producing areas lie far inland—away from her industrial areas, and her transport costs are

high. The U.S.A. is deficient in domestic supplies of manganese, tin, mica and chromium. Inadequate domestic production of chromite is a problem since the U.S.A. has consumed half of all the chromium ore produced in the world during the past 50 years. The use of chromium in U.S.A. is associated with steel, and the steel production is on the increase which will bring in its wake greater need for chromium. Although the U.S.A. has large deposits of molybdenum, it lacks many other alloys like nickel, tungsten and antimony. Small deposits are scattered throughout the States, but only a very few are of economic importance, and even these require protection by import tariff to keep them open. The important manganese fields are in Montana.

The most recent feature in the mining industry of the U.S.A. is the constant decline in the output of metallic ores through increased consumption during the last two decades. Copper resources are estimated to last 10 years more, and the country is already importing to meet 50 per cent of copper requirements. Imports now meet about 30 per cent of internal requirements in antimony, asbestos, mica, manganese and tungsten. About 50 per cent of bauxite for aluminium must be imported. Chromite, platinum, nickel and tin have to be wholly imported. In economic sense, the U.S.A. is likely to become a "have not" nation in many essential minerals.

Hydro-electricity plays a very important part in the industries of some areas in the U.S.A. Large streams, big waterfalls and huge dams are being used to generate electricity for transmission to several hundred miles. With only 5 p.c. of potential water power of the world, she has more than 30 p.c. of the developed water power of the world. However, the water power is most unevenly distributed in the U.S.A. Two-thirds of it lie in the three Pacific coast States. Only one-fifth of American total is in the Atlantic coast.

The four rivers of St. Lawrence, the Columbia, the Colorado and the Tennessee are important sources of power.

St. Lawrence river with its Great Lakes storage basin is a highly important source of power because of the volume of water which remains constant. Since St. Lawrence is an international stream for use by both Canada and U.S.A., its water cannot be used without having agreement between the two coun-

tries. The Colorado river has three dams for power development, irrigation and flood control. The Tennessee River Basin has become a major, highly developed, water-power region. The TVA is a multiple-purpose federal agency which carries out its duties in an area embracing some 14,000 square km in the Tennessee River Valley states: Tennessee, Kentucky, Mississippi, Alabama, North Carolina, Georgia and Virginia. Under the Act (1933) its chief duties are flood control of a difficult river and the maintenance of navigation. There are now 27 major dams and reservoirs controlling the flow of the river ; in addition the headwaters and the shores of the reservoirs are being reforested. There is now a navigable channel 630 miles long, connecting the American system of inland waterways. This has helped the production and distribution of hydro-electric power in larger quantities.

The U.S.A. has a number of natural gas areas both in the petroleum fields and outside. The Appalachian, the Gulf region, Texas, Louisiana, Kansas and New Mexico are the leading areas. In many factories, the present trend is in favour of gas in place of coal. In future, atomic energy may also be utilised as the country has deposits of high-grade uranium in Colorado, Utah and Arizona.

The pattern of energy consumption in the U.S.A.: In 1970, of the total gross energy inputs, the demands for petroleum was 43 p.c., of natural gas 33 p.c., of coal 20 p.c., of hydro-power utility 3.7 p.c. and of nuclear power 0.3 p.c. The projected demands in 1985 are as follows: petroleum 35.6 p.c., natural gas 29.5 p.c., coal 16.7 p.c., hydro-power utility 2.6 p.c. and nuclear power 15.6 p.c. the aggregate demand for each source in terms of quantity will also increase.

Manufactures and Industrial Regions : The United States is the strongest country in the industrial world. Businessmen in the U.S. do not hesitate to denounce Government interference when they find that their own interests and their own freedom of action are threatened. Also, they will not hesitate to appeal to the Government when they consider it necessary.

About 16 million people of the U.S.A. are engaged in manufacturing industries. Industry groups employing the largest average number of production workers includes transportation

equipment 1.3 millions; machinery 1.2 millions; food 1.1 millions; clothing 1 million; primary metals 990,000; textiles 975,000 and fabricated metals 837,500. The overall industrial production was 300 times more from 1939 to 1966. Such increased production was in part the result of increasing *"automation"* in industry. Machines are doing more and more of the work done by human hands in processing, assembling, packing, and distributing products. Mechanisation has made it possible for industry to turn out more finished products with less man-power to meet the increasing demands of a steadily growing population.

The foremost industry of the U.S.A. is iron and steel production, and the States which are highly developed in this direction are Western Pennsylvania, Eastern Ohio, Indiana, Illinois and Alabama. This is because there are vast coal-fields in this area; moreover, there is a good market for the manufactured goods, and iron ore required is brought from the *Lake Superior District* by cheap transport. The ore from this place goes to the lake ports, from which it is carried by railways to the manufacturing centres, such as *Pittsburg* and *Chicago*. *Alabama,* in spite of having local supplies of coal, iron ore and limestone, suffers from a handicap of being situated at a considerable distance from markets and ports. The region produces the cheapest steel in the world and the chief centre is Birmingham. In 1970, the U.S.A. produced 97·5 million tons of pig iron and 141 million tons of steel ingots as against 66 million tons of pig iron and 96 million tons of steel ingots in 1950.

Specialisation is the feature of the iron and steel production in the U.S.A. In the agricultural districts, agricultural machinery is produced and *Chicago* is the chief centre for the Middle West. Another centre of equal importance for the manufacture of agricultural machinery is *Milwaukee*. In the production of cotton cloth, the U.S.A. occupies the first place and in its export she is headed by Japan and U.K. In the textile districts of New England there is a great demand for machinery and *Worcester* is the chief centre of textile machinery. *New York,* where there is a great demand for electrical machinery on account of water-power, produces electrical engines and machinery. The great railway centres of the U.S.A., such as Philadelphia, Chicago, Pittsburg, St. Louis, produce locomotives and have large railway workshops. Ship-building is

carried on in the ports on the Atlantic, the South Pacific and the Lake districts. *Detroit* is the greatest centre in the world for automobile industry. In many ways, the automobile industry represents America's leadership in hardware and machine tools. It also presents an example of modern mass production. In the fruit-growing districts, tin-plate is made for the canning industry.

In the production of manufactures like industrial machines, locomotives, electrical machinery, automobiles, aircraft, tractors and machine tools, the U.S.A. can undersell to other countries in spite of the high wages prevailing in the country. Manufactures of transportation equipment for railways, automobiles, aircrafts and ships have come about through improved tools and processes and accelerated mechanisation.

The second important industry in the U.S.A. is the textile industry in which cotton manufactures take the lead. The first home of cotton industry lay in the "New England" States. These States have a moist climate, plentiful supply of water-power, cheap cotton from the south, cheap coal from Pennsylvania and easy access to interior markets. There is also a large centre at Philadelphia. In the Southern States of Alabama, Georgia and the Carolinas, the industry is of recent growth and produces coarse cloth for Asian and Canada markets. The cotton industry of the Southern States is destined to become the greatest manufacturing area because of its location in the heart of the cotton belt with excellent facilities for water transport.

The woollen industry has made rapid advances in the north-east with Philadelphia as the centre. Wool is imported from Australia and Argentina into Boston, the greatest wool market, from where it is distributed to the "New England" States. America is noted for the manufacture of silk which is chiefly carried on in New York, New Jersey and Pennsylvania. In cotton textile goods, the U.S.A. finds it extremely difficult to meet competition in the world market from Japan. The textile industry employs about 1·1 million workers.

Pulp and paper manufactures are important in the New England States on account of timber and water-power. The greatest centre of flour mills is *Minneapolis*. The other industries carried on are sugar-refining, meat-canning (in the States

of Maine and New York), fruit-canning (in California), fish-canning (at Baltimore) and chemicals. In recent years the U.S.A. has made great progress in synthetic rubber production. Synthetic rubber is widely used in the automobile and machine-tool industries. It is also used in the manufacture of shoes, fabrics, toy dolls, and electric transformers. Of late synthetic fibres and plastics have become an expanded group of industries.

Transportation : *The growth and development of the transport system of the U.S.A. are remarkable.* Regular passenger and freight service by railways started in 1828 when a line was constructed between Baltimore and Ellicot's Mills in Maryland—a distance of 20 km. Today, the railway lines form an elaborate network, covering the entire country. With the exception of a few mountainous, swampy or desert regions, every part of the country is within 40 km. of the railroads. With about 223,000 miles of railway lines in 1969, the U.S.A. has the largest mileage linking up the interior with the coast and uniting the distant east and west, north and south. The railways in the U.S.A. are owned and managed by private companies but the Federal Agency regulates the rates and fares. The railways operate for freight and passenger. On an average, about five-sixths of the total revenue of railroads are obtained from freight. Half of the remaining revenue is from the passengers, and the other half from mails. There are three regional groups of railways. The Northern Group serves the north-eastern States and handles about 45 per cent of the traffic. The Southern Group with 20 per cent of mileage, deals with some 18 per cent of the traffic ; the Western Group, with almost 55 per cent of the mileage, handles 35 per cent of the traffic. The trans-continental routes from the west to the east are of great importance. They carry the products of the Pacific States and of the central plain to the industrial east. From New York one line (the Northern Pacific Railway) goes to Chicago along the Mohawk Gap through Buffalo. From Chicago the line proceeds to Seattle on the Pacific coasts *via* Milwaukee and St. Paul. Another line (the Union Pacific Railway) from Chicago, after crossing the Rockies, proceeds towards San Francisco and thence to Los Angeles. New Orleans is an important centre of trans-continental routes. A railway line (the Southern Pacific Railway) starts from New Orleans and continues to Los Angeles.

The ordinary gauge of the railway line in the U.S.A. is 4 ft. 8½ inches, as in Britain.

The inland water transport of the U.S.A. falls into three broad systems—the Atlantic Sea-board waterways, the Mississippi-Ohio-Missouri system and the Great Lakes. Because of the rapids and falls in most rivers entering the Atlantic, navigation is confined to short distances from the river mouths. The Great Lakes—though of great importance for the eastward and westward movement of grain and iron ore and of coal and manufactured goods respectively, suffers from a handicap due to its situation at different levels necessitating the construction of canals and locks which limit the size of vessels for through-journey. Of the canals, thus constructed, the Soo Canals carry more traffic than the Panama and the Suez Canals combined. Rapids between the Lake Superior and the Lake Huron made it necessary to construct the Salt Ste Marie or Soo Canals. The enormous value of the Great Lakes system is, however, mainly due to its location in the very centre of the temperate zone and to its natural and artificial outlets facing eastwards towards Europe across the busy North Atlantic.

The Mississippi-Missouri system, providing navigation as far inland as the great Falls in the State of Montana, has not been so useful as it seemed at first. Navigation is greatly hindered by ever-shifting mud banks, necessitating the construction of the famous "stern wheel" boats. The river not only meanders in its lower course over its flood plain but it flows also in a southerly direction into the out-of-the-way Gulf of Mexico. Thus the Mississippi is still mainly used for very slow local traffic notwithstanding the difficulties overcome by the opening of the Panama Canal.

The inland waterways were of great importance before the advent of railways. Thereafter their importance declined and the revival started in 1916 with the heavy demands on all transportation facilities because of World War I. Since then, the traffic on the inland waterways has been on the increase. In 1963, the inland waterways carried about one-fourth the amount of freight traffic handled by the railways.

In 1969, the U.S. highway mileage including rural and urban roads amounted to 3·6 million miles.

The vast size of the country, the busy activities in industries and the availability of capital made air transport a success within 10 years of its growth in the U.S.A. It handles a large volume of traffic, larger than the total of all other countries. There are more than 7,000 air-ports of which about 3,000 are regular and the rest limited and restricted. The efficient system of beacons, direction-beams and well-equipped air-ports have helped the working of aerial navigation. The lines are linked with those of Canada and South America, and there are also trans-Atlantic and trans-Pacific services.

Notwithstanding tremendous development of transportation, U.S.A. lacks a coordinated transportation system that permits passengers and goods to move efficiently from one means of transport to another, using the best characteristics of each. In April, 1967, the Government has set up U.S. Department of Transportation to improve safety in all means of transportation and to encourage high quality, low cost transportation services to the public.

Foreign Trade and Commerce

Foreign trade of the U.S.A. is of great significance to American economy as well as to many countries outside. Her dependence on foreign trade is reflected in the production trend of her industries and commodity shifts. In the composition of export, the finished manufactures account for 50 to 60 per cent, followed by semi-manufactures and crude materials (25 p.c.), crude foodstuffs and manufactured foodstuffs (15 p.c.). About 4½ million workers or 7 p.c. of the U.S. labour force depend on foreign trade. It means that foreign trade provides more jobs than the iron, steel, machinery and automobile industries combined. Machinery and vehicles, metals and automobiles, petroleum, textile fibres, wood and paper, chemicals, foodstuffs and tobacco are the chief exports. Machinery and vehicles account for about 25 per cent of the total exports. On the production side, U.S.A. exports 20 p.c. of the total production of trucks, 30 p.c. of truck laying tractors, 25 p.c. of construction and mining equipment, 15 p.c. of coal, and between 25 and 40 p.c. of her cotton, wheat, rice, fats, oils and tobacco.

The class of goods imported by the U.S.A. is mostly raw

aterials. Many raw and semi-processed materials must be nported as they are not available in the country. She, there-ore, must import 86 p.c. of her requirements of manganese, 8 p.c. of bauxite, 80 p.c. of cobalt, 97 p.c. of nickel and 100 p.c. f tin, graphite and industrial diamonds. Newspapers import hree-fourths of their paper. Imports are the only source of offee, tea, cocoa, tapioca and cashew nuts. Considerable quan-ities of sugar, spices, olives, lobsters and bananas are also mported. There is also import of machinery, electronics and hemicals.

Between 1954 and 1968, exports increased by 90 p.c. and mports by 80 p.c. The commodity shifts are marked in respect f exports of grains (200 p.c.), chemicals (130 p.c.), and machi-ery (115 p.c.). The large increase in the import of manufac-ures is due to consumers' preferences to cheaper goods from Western Europe and Japan.

The total value of the imports and exports of merchandise n 1969 in terms of million U.S. dollars was as follows: exports 37,444 and imports 36,052. The important countries from which imports are drawn are Canada, West Germany, U.K., Japan and Venezuela. The principal customers of U.S. goods are Canada, West Germany, Mexico, U.K. and Japan.

The main characteristic in the geographical pattern of her foreign trade is that she has growing trade with advanced coun-tries though efforts are being made to intensify her exports to Asia and Africa.

U.S. TRADE BY COUNTRIES, 1969

	Export	Import
Canada	9,138	10,390
U.K.	2,335	2,121
Germany (W.)	2,118	2,603
Venezuela	585	982
Japan	3,940	4,888
India	517	344
Italy	1,262	1,204
Total	37,274	36,022

Trade Centres and Ports

The ten largest cities of the U.S.A. are New York, Chicago Philadelphia, Detroit, Los Angeles, Cleveland, Baltimore, St Louis, Washington D.C., and Houston.

New York is the most populous city and the principa financial centre of the U.S.A. It is also the leading port of entry Its supremacy as a commercial and industrial centre is due tc a combination of geographic, historical and social factors, bu primarily in the possession of the best natural port facilities and to her geographical location. The population of New York is 8 million. *Baltimore,* an important port, stands on the northern bank of the river Patapsco, an arm of Chesapeake Bay, 130 km south-west of Philadelphia. It is an important centre of traffic in bread-stuffs which are largely received by rail and shipped at this point. Other leading articles of export are tobacco, live-stock, cotton, timber and oyster. It is also the seat of extensive and varied manufactures including cotton and woollen goods, tobacco and cigars, iron and steel, etc. One of the principal industries of Baltimore is the canning of oysters. *Chicago,* the second largest city in the U.S.A. is a port of entry, located on the west shore of Lake Michigan. It is the greatest rail centre as well as a major industrial, commercial and financial centre. Its population of 4 millions is an amalgam of many ethnic and racial origins. Favoured by central location, an abundance of level lands, ready access to great coalfields and iron deposits, Chicago has developed great commercial and industrial activities. The industries are in metal products, meat and packing house products and electrical equipment. *Philadelphia* has a fine natural harbour. Its nearness to the regions of coal and raw materials makes it an important industrial centre for woollen and industrial goods, *St. Louis* is situated in the prairies between the lakes and the Gulf of Mexico. It is a great railway centre and a manufacturing town. *Pittsburg* is the largest iron centre in the world on account of its nearness to coal, iron ore and limestone. Moreover, it is situated at the junction of navigable rivers. It has also got some special advantages for glass-making industry on account of the presence of natural gas. *Boston* is an important Atlantic port. It is in addition the receiving and distributing centre of the north-eastern industrial States.

Galveston is situated at the mouth of the Galveston Bay and is the natural outlet for the bulk of the trade of the south-western States. It is the greatest cotton-shipping port in the U.S.A. San Francisco is the only natural harbour on the Pacific coast and is the sole outlet for the products of the Californian valley. The opening of the Panama Canal has made it important. *New Orleans* is the third largest city in area in the U.S.A. Steamship lines operate from New Orleans to all important areas of the world. It is an industrial centre of great importance and has industries in ship and boat-building, textiles, cigars, sugar cane refining and industrial alcohol.

Mexico

Mexico is a Federal Democratic Republic. The geographical situation of Mexico is highly favourable to commerce, as it faces both the Atlantic and the Pacific Oceans and is a neighbour to the U.S.A.—the greatest industrial country in the world.

The total area of Mexico is 1.9 million square km, and the estimated population in 1970 was 50 millions.

Agriculture is the primary Mexican industry, and the country is self-sufficient in agricultural products. Mexico is capable of producing almost every variety of vegetable product. Only about 10 per cent land is well suited to agriculture. Food grains occupy 68% of the cultivated land, of which maize accounts for 55 p.c. Coffee, wheat, cotton and sugarcane are the other crops. Sisal hemp is also cultivated extensively in the grass-lands of the north, and the Yucatan peninsula produces about 50 p.c. of the world's supply of sisal.

Mexico is a store-house of minerals—petroleum, silver, manganese, lead, zinc, gold and others. The Western Range is volcanic and this partly accounts for its wealth of minerals. Petroleum is found in Poza Rica and Escolin. Mexico is the leading producer of silver in the world, and an important producer of copper and lead. Mexico supplies about 20 per cent of the world production of silver. There are large under-developed resources of coal and iron ore, the production of which does not exceed 1 million tons a year each at present. Most of the mining properties are foreign owned. Mineral products

constitute about 30 per cent of the exports of the country. The manufacturing industries are carried on to supply the home market. About 2.2 million persons are employed in manufactures The Mexican government has received considerable foreign investment from U.S.A. for industries. The government has plans for development of consumer goods and basic industries. Because of the mountainous nature of the relief transportation is expensive. The hard-surfaced high roads and railways are yet inadequate. 70 p.c. of the Mexican railways are state-owned The total length of roads is only 42,000 km. The Gulf Coast of Mexico has no first class harbour ; the harbours on the Pacific side are, however, better, but as yet their commerce is small. Cotton, sugar, cigars and cigarettes are manufactured in great quantities for export. Two-thirds of the trade are with the U.S.A. The other important buyers are Japan and West Germany.

Mexico is the capital and is an industrial centre for the production of leather and leather goods. *Tampico* and *Vera Cruz* are the two ports.

QUESTIONS

1. Discuss the position of Canada as: (*a*) an agricultural country ; (*b*) a producer of minerals. (Cal. B. Com. 1953).
2. "Though young in the industrial field, Canada has made rapid progress in the matter of industrial development." Give your reasons as to how it has been possible for it to make such progress.
3. Discuss the factors of localisation of the cotton textile industry in north-eastern U.S.A. and account for the gradual decline of the North-East and ascendancy of the Southern States in cotton manufactures in recent years. (Cal. B. Com. 1955).
4. Examine the influence of geographical factors on the localisation of the iron and steel industry in U.S.A. (Cal. Inter 1957).
5. Discuss the conditions—physical and economic—underlying the pattern of hydroelectric power development in U.S.A. (B. Com. 1964).
6. What are the chief mineral products of the United States of America and where are they obtained ? (Delhi B. Com. 1969 ; Delhi B. Com 1971).
7. Name the commodities of which the U.S.A. is the largest supplier in the world's markets. What other parts of the world are also important producers of these commodities ?
8. Describe the development in transport facilities that has given impetus to agricultural production in Canada. (I. I. B. 1971).
9. Indicate carefully the coal resources of the U.S.A. How have they helped the development of the industries of the country ?
10. Give geographical reasons for the following:
(*a*) Canada has developed paper industry.
(*b*) U.S.A. though a large producer of maize does not export much of it. (Indian Institute of Bankers, 1967).

11. Comment on the situation of the chief coal-fields and the chief manufacturing areas of the United States. (Cal. Inter 1951).

12. What are the principal manufacturing industries of the U.S.A. ? Describe the areas where these industries are carried on. (Delhi Univ. B.A. Hons. 1950).

13. There is every indication that the industrial frontier is moving into the Southern States of the U.S.A. What do you think are the causes for this shift ? (Delhi Univ. B.A. Hons. 1951).

14. Describe fully the iron ore resources of North America and their present exploitation. (Delhi Univ. B.A. Hons. 1951).

15. What are the advantages of the U.S.A. for the development of manufacturing industries ? Comment on the location of the major industries of the country. (Cal. B.Com. 1952).

16. Indicate the geographical background of the location of iron and steel industry of the U.S.A., and explain the advantages of the United States over the iron and steel industry of the N. W. European countries. (Delhi B.Com. 1959 ; Cal. B.Com. 1956).

17. Write an account of the major coalfields of the United States, and indicate their influence on the location of industries in the country. (Cal. Inter. 1955).

18. Discuss the practicability of economic self-sufficiency for the U.S.A.

19. Give a comparative account of the distribution and utilization of forests in Europe and North America.

20. Describe the distribution and production of petroleum in U.S.A. (Delhi B.Com 1965).

21. Write short notes on the following: (*a*) agricultural belts of the U.S.A., and (*b*) principal manufacturing industries of the U.S.A. (Indian Institute of Bankers, 1967).

22. Account for the development of food industries in the U.S.A. (I. I. Bankers, 1971).

CHAPTER XII

SOUTH AMERICA[1]

South America is somewhat smaller than North America and occupies the fourth place as regards size among the continents. In its 7 million square miles of area, it has about 175 million population. It means that five per cent of world's population is combined to more than 12 per cent of the world's total land surface. The racial character of the population is interesting in view of the impact of external groups on native population. There is a great mixture of Indian groups—the early inhabitants of the continent—with the peoples of European blood. The Negroes who came later constitute a pure or mixed group. The principal racial groups today are Indians (Andean and Inca), Europeans, Mestizo (mixed European and Indian) and Negroes. South Central Chile, Argentina, South West Uruguay and Southern Brazil have a large unmixed European population. The most important feature in the continent is the absence of racial bitterness. The greater part of South America lies south of the Equator and within the Torrid Zone. South America has a shorter coast-line than any other continent except Africa. The coast is singularly devoid of indentation. Only in the south-west it is somewhat broken. The west coast bordered by the lofty Andes is steep and high with only one opening, the Gulf of Guayaquil. The Brazilian plateau has mountain edge along much of the eastern shore, and makes the coast inhospitable except at the mouths of the great rivers.

The important rivers are the Amazon, the Orinoco, the Plata and the Colorado. The Amazon is 6,000 km long and is the greatest river in the world. Its slope is extremely gentle. It is navigable by large ships up to 1,600 km from the mouth, and by small boats up to the foot of the Andes. The Amazon

[1] For statistics and data see the Statesman Year Book 1971-72 and Statistical Year Book 1970 (U.N.O.). Also, see E. H. Shanahan: South America; F. J. Clarence: South America; Whitebeck and William: Economic Geography of South America.

with its tributaries provides 75,000 km of navigation. The inner basin of the Amazon is the world's largest forest area. The whole of Western Brazil is covered by the Amazon watershed. As a waterway, the Amazon is not very important because of the paucity of population in the region through which it passes and also because of the limited products of similar types throughout the region. The Orinoco in the north is navigable for more than a thousand km. The Parana system is very important in the continent from the point of view of commerce. The river rises on the southern edge of the Guiana Highlands and flows through the heart of Argentina, Paraguay, and Southern Brazil. The Parana and the Uruguay waters drain half the continent and join as the Rio de La Plata river. The *Rio de La Plata* is both an estuary and a river as it fulfils some of the conditions of each. According to international law it is a river and is 200 km wide. Much silt has been deposited on the Plata by the Parana and the Uruguay; often ships run aground until the next tide floats them again. Tides usually make a difference of about 3 feet. Winds, however, influence the level much more; strong winds, particularly the Pampero blowing from the south-west, can raise or lower the level by double that amount. The Desert of Patagonia lies on the south of this river basin.

Nearly four-fifths of South America fall within the tropics and, therefore, the greater part of the continent has a tropical climate. The temperate belt lies to the south beyond 30° latitude. In no part of South America is the continental type of climate present. The north coast has most of the rains in July whereas the Brazilian highlands and the Parana-Paraguay basin have the greatest rainfall in January. The south of the Parana-Paraguay basin receives little rainfall. The Amazon Basin has a heavy rainfall throughout the year.

The Problems of South America

I. There are many empty areas in South Venezuela, eastern Colombia, eastern Ecuador, eastern Peru, eastern Bolivia, northern Paraguay and northern Argentina on account of prevalence of disease or bad climate or distance from the coast. These areas have made the transport system fragmented.

II. The lack of co-operation and the presence of borde disputes are also responsible for the slow political and economi development of the continent. For instance, the relation between Chile and Bolivia are very strained on account of th port of Africa and the use of the waters of the river Lanca For 80 years, the misunderstanding has been continuing abou a strip of Pacific coastline that is now a part of Chile and tha was once Bolivia's outlet to the sea. Bolivia is a land locke state, and badly requires a way to the sea. The Chileans hav constructed a railway line to connect La Paz (capital of Bolivia with Africa (Chilean port), but then, the Bolivians feel that i costs more to rail their tin ore from mines to the port than i does to ship it from there to the refinery at Liverpool. Then again, because of Argentina's strained relation with Chile, th former agreed to extend all port facilities to Bolivia in th Argentine river port of Barranqueras on the Parana river s that Bolivian goods could be moved through the Atlantic. Bu since the Pacific route is shorter and more economic, Bolivia i interested in the Chilean port. Thus, the border disput continues.

Further, the political situations in some states are mos violent and abnormal. This results in frequent changes in th government as in Bolivia.

III. The shortage of coal: Rich in almost every othe mineral, South America is poorly provided with coal deposit

There are only a few areas of coal-bearing rocks becaus the Highlands of the east and north-east are of *pre-Paleozoi rocks* and the sediments are very young. However, small depc sits of good quality coal are found in Peru and Chile. Th poverty of South America in coal compelled the continent t devote its attention to the production of raw materials an agricultural and pastoral produce. But the discovery of petrc leum in Peru, Venezuela, Argentina, Ecuador and Colombi has brought a new industrial life in the continent. Hydrc electric power can also be developed to a great extent as th continent is full of rivers and waterfalls.

IV. Most States are one-crop or one-product countries, an they live on exports. The individual States have little interes in the continental market, and the surpluses must be exporte outside. South American trade depends on Europe which take

more than 60 per cent of the continent's exports. Therefore, whenever the European demand for South American goods falls as a result of war or blockade, the consequence is disastrous. Of late, the share of North America in the trade of South America has increased considerably.

Economic Life

Greater part of South America's population derives its livelihood from agriculture. Subsistence agriculture, commercial farming and plantation agriculture prevail side by side. The principal crops are coffee, rubber, sugar cane, cotton, cocoa and bananas. Mining is an important activity, but the greater part of it is controlled by foreign capital. South America supplies 16 p.c. of the world's petroleum. The other minerals are gold, copper, silver, zinc, mercury, vanadium and iron ore. One of the world's important iron ore bodies is in South America. Mining is more significant in the national economy of Andean countries like Venezuela, Colombia, Ecuador, Peru, Chile and Bolivia. In recent years, South America has become very important for fish catches. In only three countries manufactures have developed for export, which are Brazil, Ecuador and Uruguay. The important products are cigarette and rayon.

Colombia occupies the fifth place among the States of South America in respect of size. It has about 21 million population. The bulk of the population lives at altitudes from 4,000 to 9,000 feet above sea level. It has a coastline of about 3,000 km of which 1560 km are on the Caribbean Sea and 1440 km on the Pacific Ocean. The country thus occupies a favourable geographical position. Although the soil is fertile in Colombia, the agriculture is not very important. Mild coffee, rice, banana, rubber, fibre and sugarcane are grown for domestic consumption. In the production of *mild coffee*, Colombia ranks first. Coffee cultivation is mainly carried out on the slopes of the Cordillera of the Andes. The Cordillera comprises vast areas of fertile and deep soil of volcanic origin, excellent for coffee cultivation. Coffee furnishes one-third of the total value of agricultural production and represents over 70 p.c. of Colombia's total exports. The banana plant is the most commonly used temporary shade. Permanent shade is

provided by various species of trees. Transportation from the producing areas to the commercial centres and ports is a big problem in connection with coffee. Other crops are rice, sugarcane, maize and wheat. Rubber trees grow wild, and their cultivation has begun. Livestock includes cattle, pigs, horses, sheep, goats and mules.

The mineral wealth of the State is very great. Gold and silver are found in considerable quantities in Antioquia, Cauca Caldas and Tolima. Iron, coal, copper, lead and platinum are also obtained. Colombia has the world's largest platinum deposits. Next to coffee in importance is the production of petroleum. In various parts of Colombia petroleum is found and the rapid increase in its output has made Colombia the second oil-producing country in South America.

The means of Communication are exceedingly bad because of the mountainous character of the country. Climatic conditions, coupled with the obstacles of communications between different parts of the land, have retarded the economic development of the country. In civil aviation, however, Colombia ranks third, after Brazil and Argentina, among the South American countries. The manufactures of Colombia are varied, and the principal ones are woollen, cotton, artificial silk, chemicals, metals and consumer goods. More than 60 p.c. of the foreign trade is with the U.S.A. The next important country is West Germany with only 10 p.c. share. The capital is *Bogota* situated at a height of 8,000 ft. above sea level and enjoys a healthy climate.

Venezuela. The Republic of Venezuela has an area of about 352,000 sq. miles and a population of 11 million. It is mainly an agricultural country. There are three distinct zones of production—the agricultural, the pastoral and the forest zones. The agricultural region, situated in the northern part of the country, includes vast fertile lands. The agricultural products are wheat, rice, tobacco, maize, coffee, sugarcane, cotton and beans. One-fifth of the population is engaged in agriculture. Progress is being made in the introduction of modern methods and equipment in agriculture. Among mineral products gold, copper, petroleum, coal and iron are important. The chief oil-fields are located in the Lake Maracaibo basin

nd eastern Venezuela. Venezuela has become the leading oil roducer in South America and the third largest producer in he world. In 1969 production of crude oil was 188 million netric tons and export 120 million tons. Large foreign oil ompanies own the concessions. The production of iron ore vas about 13 million tons in 1969.[2] The south-east of Cuidad Bolivar is known for gold mines. The rate of increase of ndustrial production and the national income has been very igher in Venezuela because of oil revenues which are "ploughed ack" into the urban sector, mainly through large-scale investnent in transport and public works. The process of industriali-ation has started, and the manufactures are chemicals, textiles nd finished metals. Of the total value of exports, petroleum nd petroleum products account for 90 p.c. The other exported products are iron ore, diamonds and coffee. More than 45 p.c. of the exports, in terms of value, is received by the U.S.A. The important towns are *Caracas* (capital) and *Valencia,* and the ports are *La Guaira* and *Port Cabello.*

Ecuador with 261,000 sq. km of area is one of the smallest South American States. It is situated in the north-west of South America, with about one-fifth of its area lying north of the Equator. It has about 6 million people. The main crop is cocoa, on which the greater part of the country's prosperity depends. Next in importance are rice, ivory-nuts and coffee. Coffee is cultivated on a large scale in conjunction with the cocoa plant and the banana, which serve as shelter for the coffee-plants. There are several suitable coffee zones most of which are confined to the west, especially in the province of *Manabi.* The State has considerable mineral wealth, but so far mining operations have not developed much. Oil-deposits are important. Because of the increasing demand in the country for oil, there is hardly any export. In 1969 the oil output was 200,000 metric tons. The country has deposits of gold, silver, copper, iron, lead and coal. Ecuador is the chief producer of

[2] "Venezuela's economy is based mainly on what the German economists call *raubwrist schaft,* a plunder economy which lives on the sale of capital assets like oil and iron ore and not on current production. Efforts are being made, however, to develop a national economy independent of oil." (Statesman Year Book, 1965-66, p. 1594). Already the country has resorted to planned development. High import duties are levied on many products to protect the domestic industries.

"Panama" hats. The industrial development has been considerable in recent years because of protection and benefits such as exemption from sales tax. The principal manufactures are textiles, sugar and cement. The exports consist of bananas and plantains, coffee, cocoa, rice and hats of which bananas account for two-thirds. Three-fifths of the exports go to the U.S.A. The capital *Quito* is situated at an elevation of 9,000 ft. *Guayaquil is the chief seaport.* It normally handles about one-half of the total exports. The other ports are Manta and Bahia de Caraquez.

Bolivia. The area of the State is 1 million sq. km with a population of 4.3 million. The means of communication are bad, and the State has no port of its own. Agriculture, stock-raising and mining are the chief industries. Tin, copper, silver, gold and petroleum are the principal mineral products. Bolivia contributes more than 16 per cent of the world's total production of tin and ranks third in the list. Bolivia is supposed to contain potentially the largest oil-field of South America, though the present production is only about 1.8 million metric tons. As Bolivia at present cannot satisfy its own requirements of oil, the volume of oil export is very small. Petroleum is found mostly in the north-west region, near the border with Peru. Sheep, Alpacas and Llamas are reared extensively. The chief agricultural products are coffee, cocoa, rice, sugar and tobacco. Mineral products represent about 88 p.c. of the total exports of which tin ore accounts for 80 p.c. The other minerals which are exported are silver, antimony ore, copper ore, lead ore and petroleum. *La Paz* is a commercial centre and the seat of government. The constitutional capital is *Sucre.*

Chile. The Republic of Chile is one of the most progressive States of South America. The area of the country is 742,000 square km. The coastline is a long-tape-like land of 2,660 miles and the average width of the country is 170 km only. The density of population is 20 per square km. The population is about 9·8 millions. The Republic ranks seventh in size among the States of the continent.

Desert conditions prevail in the northern side of Chile. Nevertheless it is a centre of great industrial activity. Great deposits of nitrate of soda are found, the export of which pro-

ides one of the chief sources of Chilean revenue. The Republic lone supplies practically all the world's requirements of natural itrate of soda which is used as fertiliser and in chemicals and xplosives. Recently the introduction of synthetic nitrates has reatly affected the Chilean nitrate industry. Copper, gold nd silver are also obtained from Northern Chile. Copper ore s the most valuable export and about 14 per cent of the world's roduction is obtained from the Republic. Chile's copper eserves are 37 per cent of the world's reserves.

Central Chile is very important from the agricultural point of view. Here the Mediterranean type of climate prevails. It s the most highly developed and most densely populated region. All the agricultural produce is sent to Northern Chile to meet the demand of the large mining population there. Both water-power and coal are abundant. The manufacture of wine is also an important national industry and the Chilean wines are much in demand both at home and in the neighbouring States ; some are also exported to Central Europe. Southern Chile provides suitable grazing ground for cattle and sheep. The forest resources have been little exploited. The provinces of Valdivia, Llanquihue and Chiloe have extensive forests of pine and eucalyptus.

Chile is the chief mining country in South America. With he world's third largest copper reserves, incalculable stocks of timber and 4100 km of territorial waters richly stocked with fish, Chile promises to be one of the richest countries in South America to be able to feed many times more than its present size of population. But Chile's industrialisation has come about from a sense of necessity. Always a mono-exporter, first of farm products and wines, then of nitrate and finally of copper, Chile found after the slump of the 1930s that her foreign exchange income was no longer sufficient to pay for her imports, and had to turn to import substitution. Chile has developed recently the manufacture of consumer goods previously imported.

The Chilean Production Development Corporation (C.O.R.F.O.) has provided the country with most of its basic production facilities, ranging from the steel company to the newly fledged petro-chemical industry, and successfully sold many of them to private investors.

The manufacturing activities occupy one-fifth of the active population of Chile, provide 40 per cent of the country's wage bill, and one quarter of the national income.

Copper ores, copper ingots and copper sheets constitute 66 p.c. of the total value of exports of Chile. The other products exported are iron ore, saltpetre, wood, fish, beans and wine. U.S.A., U.K., West Germany, Netherlands and Argentina are the principal buyers. The chief town is *Santiago*. The two important ports are *Valparaiso* and *Iquique*.

Brazil, a constitutional Republic, occupies nearly half the area of the continent and rivals the U.S.A. in respect of size. The area of Brazil is 8·5 million square km with about 9 million population. The average density of population is 1 per square km. The highest density of population is in the *Sao Paulo* region where it is 90 persons per square mile. The language of the country is mainly Portuguese. Though it has a long coast-line of more than 4,000 miles, the country is singularly devoid of good harbours. The north coast is low and swampy and in the south it is bordered by a sandstone reef. The country has a large number of rivers, the longest of which is the Amazon, nearly 6,000 km long. The country is so vast in area and its economic possibilities are so great that it is sometimes described as a *sleeping giant*. From the point of view of technical progress, there are two Brazils—the old and the new. Old Brazil lies to the north and modern Brazil to the south. The difficulty of moving men and goods from one part of the country to another is the most serious problem today. The unbalanced distribution of population and the poor condition of the economy are aggravated by lack of transportation. Only 9 p.c. of the land is under cultivation, and about 55 p.c. under forests. In spite of the big size of the country and its small population the area of cultivated land per inhabitant in Brazil is smaller than in most countries in Europe. The mineral possibilities are very great. Consequently, Brazil has a tremendous reserve of potential wealth. The problems of capital, paucity of labour and unhealthy climatic conditions in the north are being handled by the government most effectively in cooperation with a number of international organisations. Already, Brazil is the world's third largest producer of both sugar and cocoa, th

second biggest international source of sisal and among the top five cotton exporters.

Agriculture is the most important industry. Because of the concentration in the production of export crops, food production has been very much neglected. Best and accessible land is exploited for export crops, and therefore food production does not keep pace with the growth of the population. The products are coffee, cocoa, rubber, sugar, tobacco and cotton. Brazil supplies more than 20 per cent of the world's coffee. Much of the prosperity of the country depends on this particular commodity. Coffee is grown in nearly all the States of Brazil. The favourable zone is a vast tract of land which from north to south extends from the banks of the Amazon to the State of S. Catherina, and from east to west, from the Atlantic coast to the western extremity of the State of Motto Grosso. This extraordinarily wide stretch of land is nevertheless devoted only to a small extent to coffee. *Cultivation is confined to Sao Paulo, Minas Geraes, Espirito Santo, Rio de Janeiro, Parana, Bahia and Pernambuco which supply between themselves 90 per cent of the country's production. Sao Paulo alone produces two-thirds of the total.* As a matter of fact, Sao Paulo is the main coffee-producing centre not only in Brazil, but also in the whole world. There are many reasons for its success in this region. In the interior of Sao Paulo, there is a plateau, with an average altitude of about 1800 feet stretching from the western slopes of the maritime chain to the river Parana and sloping gently from east to west. The soil of the place is rich in iron, a mineral which the coffee plant requires in ample supply. The climate is also well suited to Europeans and is sufficiently invigorating to encourage bodily activities. Thus the interior plateau of Sao Paulo offers optimum conditions for coffee plantation. The government regulates the sales of coffee, and the growers receive a variable subsidiary on each bag.

Brazil ranks third in the production of cocoa which is extensively grown in Bahia. Two-thirds of Brazilian cocoa go to the U.S.A. Sugar and tobacco, are becoming increasingly important. With regard to maize, Brazil is the fourth among the producing countries of the world, being excelled only by the U.S.A., U.S.S.R., and China. In recent years the cultivation of cotton has also advanced rapidly. The fibre is short but it

is of good quality. Cotton is Brazil's second biggest earner of foreign exchange, after coffee, and the product has made a deep impact on world cotton markets. Rubber is found in the Acre territory and the States of Amazonas and Para.

Next to agriculture, the pastoral industry is important. Pigs, sheep, horses and cattle are extensively reared. The country is one of the most important pig-rearing countries of the world. The possibilities of Brazil's cattle and meat production are unlimited because of high quality cattle herds, and its enormous areas of virgin lands—well watered and free from insect-borne diseases.

Though mineral resources are great, they are not worked very much on a commercial scale because of lack of domestic capital and the presence of unfavourable mining lands, discouraging the foreign capital. The principal minerals are chrome ore, mica, zirconium, graphite, manganese, coal, iron, gold, salt, industrial diamond and beryllium. Monazite ands containing thorium are found along the coast of Rio de Janeiro and Bahia. Brazil is a large manganese producer. The local consumption is small and practically the entire production is exported. The chief mines are in the State of Minas Geraes. There has been also a small production of manganese near Nazareth, Bahia State. Coal is found in *Rio Grande de Sul, Santa Catherina, Parana* and *Sao Paulo.* Iron deposits exist chiefly in Minas Geraes. The Government has recently opened up a new iron field at *Itabira* which is believed to be one of the richest iron fields in the world. Gold is widely distributed, but it is chiefly mined in *Minas Geraes.* High-grade quartz crystal is also found in Brazil which has already become the sole producer of piezo-electric quartz, a strategic mineral in universal demand. The country possesses a great potentiality of hydro-electric power.

Lack of communication is a serious obstacle to agricultural expansion as high cost of transport does not encourage agricultural development of the more remote regions. There are 23,000 navigable miles on the Brazilian rivers, of which the Amazon is the largest. Cataracts and falls on the Amazon are the obstacles. In the south, the Uruguay handles commercial vessels. Brazil has 35,000 km of railway lines, most of which

re concentrated in the south-east—radiating out of Rio de aneiro towards the mining and farming region of Minas Geraes nd out of Sao Paulo through the coffee country and southward. lore than 50 p.c. of the railway lines are in the three States f Minas Geraes, Sao Paulo and Rio Grande de Sul. The road attern is almost like the railway pattern, serving the same reas. Brazil has developed airways, but as yet the great bulk f people and goods remains unaffected.

The manufacturing industries are rapidly developing. Cotton weaving is the most important industry in Brazil which mploys about one-fourth of all industrial workers. Most of he cotton factories are in Sao Paulo and Minas Geraes. Woollen nanufactures, sugar refineries, breweries and fruit-canning are he other industries. The Government helps these industries y levying protective duties on imported goods. A big paper nill—the largest of its kind in South America, is at Monte Algre, Parana. The chief exports are coffee, preserved meat, ubber, cotton, hides skins, leather, tobacco, cocoa, meat, sugar nd timber. Though there has been much rapid development within recent years in industry and mining, the position of Brazil in the world market is still that of an agricultural exporter: it has successively held first place as an exporter of ugar in the 18th century, of rubber from 1880 to 1910, and of offee since the mid-nineteenth century. Coffee, cocoa, oilseeds, ugar and cotton still provide four-fifths of the total exports. The other exports are iron ore, sugar and pine wood. About wo-thirds of the exports are received by the U.S.A. West ermany accounts for 16 p.c. of the exports. Italy, Netherlands, J.K., France and Sweden are other buyers. The imports are ainly cereals, mineral fuels and chemicals. *Rio de Janeiro,* he capital of the Republic, is the chief sea-port and possesses n excellent harbour. *Santos,* in the south, is noted for the xport of coffee. *Bahia* and *Pernambuco* export sugar, cotton nd tobacco.

Argentina, a Federal Republic, has an area of 2.5 million quare km and the population is 24 millions, mainly composed immigrants from Southern Europe. The density of popula- on per square km is 10 persons. It is the most progressive tate in South America. The rivers are the Parana, Paraguay nd Uruguay, which are all navigable.

The mineral wealth of Argentina is not great. Petroleun coal, salt, lime, lead, gold, silver, copper and tungsten are beir exploited. Except for petroleum, the minerals are not impo tant in the economy of the country. Water-power is yet undev loped, but the possibilities are great. The country is mainl an agricultural one and may be described as the granary (South America. The State is one of the world's largest pr



FIG. NO. 69

ducers and exporters of agricultural products. About 11 p.c. of the total area is under cultivation. Agricultural development is the greatest in the east, where nearly all the cereals are grown. The principal crops are wheat, oats, maize and oil-seeds. About 50 p.c. of the total area is under wheat and linseed. Cotton, potatoes, sugar, tobacco, rice and yarba m (Paraguyan tea) are also cultivated. The pastoral industry of considerable importance. Sheep, cattle, pigs and horses are reared in the south-west. The political power is largely in the hands of the land-owning cattle-breeders. Meat refrigeration is the principal industry and the country has the largest refri-gerating plant in the world. The importance of Europe Argentine meat trade can be judged from the fact that

of Argentine exports of meat are for European countries. The pattern is similar with other kinds of meat.

The Atlantic coastline of Argentina is rich in marine life. It is believed that the Patagonian Shelf offers great fishing possibilities. Whale and seal are at present the most important catches.

The Republic has about 42,000 km of railway line which are all State operated. The lack of uniformity of gauge is the main drawback of the railway system. There is a transcontinental railway line connecting Buenos Aires with Valparaiso (Chile)—a distance of about 900 miles. There are about 42,000 km of roads in Argentina, facilitating traffic also with Chile, and Uruguay and Paraguay.

Domestic industry produces practically all the consumer goods required, and many of the more basic capital goods. The great demand is, however, for more sophisticated capital goods, machinery and vehicles and semi-finished products for industry. The manufactures of Argentina are flour-milling, textiles, chemicals, sugar etc. With the assistance of the Government, Argentina is on her way to industrialisation in order to broaden her existing economic base. Because of the absence of iron ore, the country has based her manufactures on raw materials available in the country.

The chief exports are cereals, meat, linseed, wool and tobacco. The imports are iron and steel goods, cotton and woollen goods and railway plant. Argentina depends on agriculture and livestock for more than 90 p.c. of its exports. Well-over half of the country's trade is with Western Europe. Main customers are Italy, Britain and Netherlands. Next in line is Brazil and among other important purchasers are the U.S.A., Germany and France. The U.S.A. is the biggest supplier—although it supplies less than 25 p.c. of total imports—followed by Brazil, West Germany, Italy and U.K.

Buenos Aires, the capital of the Republic, is situated on the river Plata and it is also the chief sea-port. Buenos Aires handles about four-fifths of the imports of the Argentine Republic and three-fifths of its exports. Commercially, socially and economically, the city dominates the whole republic. One serious defect of the port lies in the fact that the river is shallow and requires constant dredging. *Rosario* has an excellent har-

bour. It is the most important port for the export of wheat; a good harbour already, the port may develop further in future.

Uruguay, the smallest South American State, lies between the Argentine Republic and Brazil and is one of the most democratic and progressive of South American countries.

Uruguay has an area of 187,000 sq. km with 2.9 million inhabitants.

The mineral resources are gold, copper, silver, iron, tin, mercury, mica, slate, gypsum, cobalt and marbles. But little has been done so far to develop mining industry on a large scale because of limited quantities available for commercial exploitation.

The raising of cattle and sheep is the principal industry, mainly carried on in the south and the west. About 60 per cent of the total area is devoted to stock-raising. Animals and animal-products account for 95 per cent of the country's exports. The greatest source of income at present is wool.

Only 9 per cent of the area is devoted to agriculture. The principal crops are wheat, maize, oats, rice and linseed. The wine industry is of some importance, having an output of over 15 million gallons.

Uruguay is largely dependent upon foreign trade for her national income. The exports are predominantly wool, meat, linseed oil and hides. Other exports are wheat, maize, oranges and building stone. Animals and animal products constitute 95 p.c. of the exports of which wool alone accounts for 50 p.c. Imports are fuel oil, petrol, coal, cotton goods, sugar, iron and steel and machinery. Overseas trade is chiefly with U.S.A., West Germany, U.K. Brazil and France.

Montevideo on the Plata, with railways running to most parts of the interior, does the whole external trade of the country. Other cities are Paysandu, Salto and Mercedes.

Peru has an area of 1.2 million square km with about 13.6 million population. The average density of population is 14 per square mile. The economic resources are varied. In the uplands gold, silver and copper are found. Petroleum is also being worked there. At present copper ore and petroleum are the chief minerals exploited. Crude oil output in 1967 was 5 million metric tons. About 70 p.c. of the oil production is consumed in the country. Peru is one of the largest sources

of vanadium. Agriculture on which 80 p.c. of the population depend is highly developed in the coastal region. The agricultural products are sugar, cotton, tobacco, maize, India-rubber and coffee. The gathering of wild rubber, once the most important industry in the Amazon region of Peru, is being revived. Although Peru is an agricultural country, it has a number of manufacturing industries to meet the demand of the internal markets. The most important is the textile industry. The principal exports of the country are raw cotton, sugarcane, iron ore, kerosene and wool. The imports are foodstuffs, drinks and tobacco, machinery, textiles and chemicals. The U.S.A. is the most important buyer and seller. The other countries in Peru's foreign trade are U.K., Japan, Argentina, Netherlands, West Germany and Belgium. *Lima* is the capital and trade centre.

QUESTIONS

1. Describe the factors that are checking the development of tropical South America.
2. What are the economic products of South America ? Show how they compete with Indian products in the continent of Europe.
3. Give a short description of Brazil and mention its chief exports.
4. Describe the economic resources of Argentina. In which two commodities does the Republic compete with the Indian produce in the U.K. ?
5. Discuss the nature of trade between India on the one side and the South American States of Brazil, Argentina and Chile on the other. In what way do you expect this trade to be modified in the near future ?
6. Describe carefully with the aid of a sketch map the distribution of sheep in South America. Under what conditions does the animal thrive best ?
7. Name five principal sea-ports of South America, and point out the parts of the country for which they are trade centres. Mention their chief exports.
8. "Argentina is likely to remain, for many years, one of the most exclusively agricultural countries of the world." Discuss.

CHAPTER XIII

AFRICA[1]

Africa is the second largest continent and has 24 million square km of area. In 1970, its population was estimated at more than 346 millions. The average density of population is about 20 persons per square mile which is rather low compared to major inhabited land masses except Australia, South America and the Asian U.S.S.R. Although Africa contributed through Egypt to the greatness of the Mediterranean civilisation before the dawn of history, yet *economically, politically and socially* Africa remained backward for many years. In recent years however Africa has undergone tremendous changes in technological, economic, social and political affairs—almost of a revolutionary order, and is playing a major role as an independent force in world politics. While before the World War II, there were only four independent states, today the number is more than thirty-six, each one of which is being approached by different power groups in the world for establishing new relationship. If politically Africa has emerged as a force, its potential economic strength is also enormous, and for years to come the overriding preoccupation will be the rapid economic growth. Africa is rich in its soil, plants, minerals and labour. It possesses large areas of relatively level land and small proportion of mountainous terrain. Some of the world's mighty rivers are in Africa. In man-power it stands fourth in the world. As a source of raw materials like cotton, gold, diamond, zinc, tin, phosphate, wool, rubber, hides, graphite, vegetable oil, cocoa and timber, Africa has long been of great value to Western Europe.

The continent, however, has several serious disadvantages. These are: (1) lack of *harbours*. The coastline is remarkably regular and no deep gulf runs into the land. Although in area Africa is three times the size of Europe, its coast-line is less

[1] The sources of statistics are the Statesman Year Book, 1971-72; Statistical Year Book, 1970 (UNO) and Production Year Book 1971 (FAO).

than half as long. Africa has oceans on all sides but their influence on climate and commerce is insignificant. A great part of Africa lies within equatorial regions, and its coasts are narrow and thickly forested. Its tableland also prevents the influence of the sea from reaching the interior. In the north-west, the coast borders the Sahara desert. (2) The rim of mountains, which almost everywhere borders the continent, causes rapids and falls in the rivers. The Congo, the Nile, the Niger and a few other rivers are navigable in certain parts of their courses, but such navigation is only of local significance. (3) Desert conditions prevail in the north-western and south-western sides, while large areas within the tropics are extremely enervating. (4) Much of the potential resources of Africa are found in the high plateaus which are sharply separated from the coast by deserts and swamps.

The difficulty of moving men and goods from one part of the continent to another is the greatest handicap to development and progress. The railways are mostly concentrated in South Africa. Some points of the vast interior are reached by roads, but most of it is inaccessible even today because of dense forests, disease and wild animals. There are many large rivers in the continent with flow of water throughout the year but then except the Nile the others flow through undeveloped regions of the tropic zones. Most of the rivers also descend from the interior tableland by a series of falls or rapids that make it impossible to reach the interior by ship from the ocean.

In spite of these physical bottlenecks, the African nations are determined in developing their economies through better administration, more international cooperation, and improved science and technology.

The flow of private foreign investment in Africa has been very little in view of the suspicions of foreign investors in the newly independent African States. Unless the states are in a position to give confidence to private investors, economic conditions will take time to improve. On the basis of per capita incomes, the people of Africa are desperately poor. Yet, an underdeveloped country is not necessarily a poor country. The fact is that in Africa there is shortage of fertile land and other natural resources. Its labour force is large in relation to its

natural resources. Since in every State, concentration is being aimed at developing capital intensive industries, the development of agriculture has received a set-back for the time being.

Agricultural and Mineral Production

Agriculture is the main occupation and the basis of livelihood for most countries in Africa. Because of the great diversity in climate, soil and topography, the use of land is not the same in the continent. The use of land has been influenced further by factors like commercial opportunities and racial characteristics. Broadly, tropical Africa has shifting cultivation or subsistence farming, Northern Africa and river valleys have intensive cultivation and South Africa has commercial mixed farming.

Production of most agricultural commodities in Africa has increased greatly in recent years. Increased production is appreciable with regard to the citrus fruit, groundnuts, rubber and sugar. In recent years the demand in the world market for the products of Africa is on the increase. Palm oil, copra, cocoa, rubber and other main articles, which the great central part of Africa produces, are competing with those of South-Eastern Asia, West Indies and South America in international markets.

Mining has played an important part in the opening up of many areas in Africa, and most countries depend on the success of mining operations for prosperity. Although Africa's share in the production of heavy minerals like coal and iron ore is very small, her position in respect of precious and rare minerals is strong enough to dominate the world market. Her petroleum production is about 8 p.c. of the world's total. She has the virtual monopoly in diamonds. Thirty p.c. of world's antimony is raised in Africa.

Notwithstanding her present meagre production of coal Africa enjoys an enviable position in water-power potential—at least two-fifths of the world's total.

Political domination coupled with immigration of Europeans to Algeria, South Africa, Tunisia and Morocco led to economic domination by the colonial powers. The era of colonialism almost disappeared by 1960, and there now exists only a few

areas with European settlers and their administration. The long association with the Europeans has influenced the African culture in respect of ideas and values. The uneven economic development in Africa is due, to a large extent, to the degree of assimilation of western ideas and technology.

Economic Surveys of some African Countries

Although subsistence agriculture still predominates in most African countries, the money sector of their economies accounts for 50 per cent of the value of agricultural and mineral production. A substantial proportion of what is produced is exported. World prices and market conditions favour Africa's exports. New investments and reinvestment of earnings are being made to bring about rapid industrial development.

Republic of Nigeria has approximately an area of 924,000 sq. km with 66 million population. Nigeria is predominantly an agricultural country—an estimated 80 p.c. of the total working population being engaged in it. It produces cocoa, palm-kernel, groundnuts, mahogany and gum arabic. The State has undertaken a number of development schemes, one of which is the control of the Niger and Kaduna rivers for producing plentiful cheap power, water for irrigation and the extension of navigation.

Oil has been found in economic quantities. The terrain makes exploration difficult and costly. Nevertheless, pipelines have been successfully laid to connect the main producing areas. From 1 million tons of petroleum in 1957, the country raised 27 million tons in 1969. In fact, the most rapidly developing new oil producing country in the world is now Nigeria. It has opened its first refinery near Port Harcourt. Oil exploration has brought massive foreign investment to Nigeria. Large quantities of natural gas have also been discovered. There are deposits of silver, galena, manganese ore, lignite and monazite. Industrial activity is concerned with those products which are imported in order to depend less on other countries for consumer goods like textiles, sugar, cement, paper, cigarettes, soaps and food processing. The Government encourages private investment to accelerate industrialisation. The policy of the government is not to nationalise industry "beyond the extent to

which public utilities are already nationalised". Foreign investment is encouraged for those industries which utilise local materials, employ local labour, provide opportunities for Nigerians to acquire technical skill and managerial experience, and reduce dependence on imports. Petroleum has become the most important item of export accounting for more than 60 p.c. of the total value. The other exports are cocoa, palm oil, groundnuts, rubber, palm kernels and coal. U.K., U.S.A. and Japan are the main sellers and buyers of Nigeria. The principal towns are *Lagos, Ibadan, Ogbomosho, Kano, Port Harcourt* and *Oyo.*

Lagos is the seat of the Government and an international airport for serving Europe, South and West Africa.

Ghana is situated on the Gulf of Guinea and is bounded on the west by the French Ivory Coast, on the north by the French Sudan, and on the south by sea. The area is about 287,000 sq. km with about 9 million population. The coast line is 500 km long. Ghana is rich in agricultural and forest resources. The majority of the inhabitants are farmers. The important products are cocoa, kola, oil-palm products, copra and other food crops. Ghana produces about one-third of the world production of cocoa. This product is also the major source of income and employment. Rubber and cotton are also produced in small quantities. About $\frac{1}{3}$ of the land is covered by forests which yield excellent timber. Mahogany is the most important timber for export. Gold, manganese and diamonds are important minerals for export. The industries are cotton textiles, jute, cement and sugar. The road-system has been improved recently and there are at present 12,000 km of motorable roads. The rivers are not navigable. There is a total of 900 km of railway line. The principal trade centres are *Kumasi, Accra* and *Sekondi.* The chief port is Takoradi. The country lacks three important elements for successful industrial development—good water, good communication and cheap power. She is, however, carrying out an ambitious programme in a major bid to increase her industrial potential. The Volta River Project envisages a scheme whereby a dam and a hydroelectric station will supply electricity and water for irrigation.

Already, Ghana has the highest living standard of any African people. Stress is laid on socialistic and cooperative

programmes for industry. The exports are cocoa, gold, manganese, timber, diamond, bauxite and kolanuts. The principal markets are European Economic Community (30 p.c.), sterling area (20 p.c.), dollar area (20 p.c.) and communist countries (15 p.c.).

Uganda, a member of the Commonwealth, has an area of 243,000 square km with 9·7 million population.

The resources are principally agricultural. The prosperity of Uganda has been closely bound up with the cotton crop, and the extension of roads and railways and the expansion of towns are responsible for the rapid progress made in this industry during the last twenty years. The other important crops are coffee, tea, rubber and tobacco. The present coffee crop is about 165,000 metric tons, mostly *robusta,* making Uganda the largest coffee producer in the Commonwealth. There has been a big expansion of the co-operative movement in agricultural field. Maize, groundnuts and castor seeds are other agricultural products. Some tin, copper and wolfram are mined. Copper is the most important mineral export, specially after 1956 when the Kilembe mine was opened. The tin mine opened at Mwirasandu in South Uganda is of considerable local importance. The tourist-traffic of Uganda is important. The attraction of Uganda to tourists lies largely in the variety of its interesting scenery and of its animals. Certain areas have been set apart as game reserves. Communications are maintained by waterways, roads and railways. Earlier dependence on the export of agricultural products and exposure to violent price fluctuations in the world market have led the country to diversify its output and to broaden the economic base. Imports come from U.K. (40 p.c.), Japan (12 p.c.), and West Germany (10 p.c.). The biggest buyers are U.S.A., U.K., Belgium, China, India and Canada. *Entebbe* is the capital. *Kampala* is the commercial centre and *Jinja* is a port on the Lake Victoria.

Kenya, a republic in East Africa, has an area of 583,000 square km with 10.9 million population. The resources are principally agricultural which are raised from sea level to 9,000 ft. Coffee, maize, sisal, wheat, tea, sugar-cane and cocoanut are the chief crops which are grown in the Highlands, Central Province and Nyanza Province. Agricultural production in Kenya is subject to certain handicaps. Apart from the fact

that two-fifths of the country are non-productive for lack of rainfall, the principal productive areas are remote from the coast, and transport charges are high by reason of the fact that almost all the goods reach their market *via* the Suez Canal. The forests of Kenya are very important for the prevention of soil erosion and for the climate. About 7,400 square miles are covered by forests, most of which are located in high altitudes. The country is self-supporting in all animal products and has built up a certain export trade with the neighbouring countries. Dairy produce is also exported to Europe. Mineral resources are not yet fully developed, though considerable quantities of gold, silver, gypsum, marble and soda ash are being worked. The Government has been taking active interest in tasks of economic development. Its Six-Year Development Plan covering the period upto 1970 aimed at substantial economic growth and higher living standards. The Policy opened up scope for foreign collaboration in many industries—large and small. The chief buyers of Kenya are U.K., West Germany and U.S.A. The sellers are U.K., Japan, U.S.A. and West Germany. Coffee is the most important item of export (20 p.c.), followed by tea, petroleum and sisal. *Mombasa* is the chief port, and Nairobi is the capital.

Tanzania The total area of Tanganyika is 750,000 square km. It has a coastline of about 450 miles to the east. The population is about 13 millions of which 9 millions consist of Africans. Agriculture (including stock-rearing) is the most important source of wealth of the country and is the principal occupation of the people. The chief crops are sisal, coffee, tea, tobacco, cocoanut, wheat, barley and nuts and kernels. Tanganyika produces about 50 p.c. of the world's sisal. Animal husbandry fills a very important place in the economic life of Tanganyika and is the principal occupation of the pastoral people. Mica, tin, coal, manganese and diamonds are being mined. Sisal is Tanganyika's most important export. Next to sisal, diamond is the most valued export mostly obtained from a single mine which perhaps is the largest diamond mine in the world. The country imports more than 80 per cent of her consumer goods. The First Five-Year Plan of Economic Development launched in 1964 emphasised the production of consumer goods and investment by the private sector. The

United Kingdom is the most important trading partner, although in recent years there have been trade agreements with several countries of the Soviet Bloc.

There are 44,000 km. of roads and a railway system. The country, however, needs a road system to connect the Lake and Western provinces with the rest of the country. There are two railways: (*a*) the central line from Lake Tanganyika to Dar-es-salaam, and (*b*) a shorter line from Moshi to provide an outlet for the coffee and sisal plantations at the port of Tonga. *Dar-es-salaam* is the chief port and capital. The other towns are Arusha, Bukuba and Mwanza.

Malawi is essentially an agricultural country with 94,000 sq. km of area, and 4.4 million population. There is a fairly large community of Indian origin who are engaged in trade and playing a leading role in the commercial life. Agriculture is the principal occupation of both the Europeans and the Africans. Tobacco, tea, sisal, cotton, rubber and coffee are the principal products. The whole economy is based on agriculture. The earliest economic crop was coffee, later displaced by cotton—which in turn gave way to tobacco, groundnuts and tea. These three are now the main cash crops of the country, and account for 90 p.c. of agricultural exports. Some minerals occur in the country, *viz.*, gold, copper, iron, mica, coal and manganese. Since the country is primarily agricultural, the principal manufacturing industries are processing industries. The main items of exports are tea, tobacco and groundnuts. The imports are machinery, metals, vehicles, textiles and petroleum. About 45 p.c. of exports and 20 p.c. of imports are with U.K. *Zomba* is the capital.

Zambia, a member of the Commonwealth, lies on the watershed of the Congo and Zambesi. It has an area of 572,000 sq. km with about 4 million population. The country possesses great agricultural and pastoral resources. Cotton, maize, wheat and tobacco are the principal crops. Cattle, sheep, pigs and goats are reared in various parts of the territory. Mineral wealth is exploited. Copper, gold, coal, zinc and tin are worked. The economy of the country is based on minerals which account for 90 per cent of her exports and provide a major source of employment. Zambia is the second biggest copper producer in the world. The manufacturing industry is still in

its infancy, and is concerned with local market. Although the prospects for the development of industries are good, lack of domestic capital is a handicap. *Lusaka* is the trade centre and capital.

Rhodesia has an area of 391,000 sq. km. Of the total population of 5 million, Europeans account for 230,000, Asians 18,000 and the rest Africans. It is mostly a high plateau and has, on the whole, a temperate climate. Mineral wealth was the principal attraction for settlement in the country. Gold comes first in importance and is mined in several places. Chromium is found extensively in the ultrabasic igneous rocks, and Rhodesia occupies a leading place in its production. Silver, asbestos, iron, copper, coal and tin are also worked. Rhodesia is admirably suited to arable and pastoral farming. Tobacco, maize and cotton are the principal crops. Maize is the staple food of a large segment of the population. The country has a few tea plantations. Stock-raising is more important than agriculture. On the splendid grass-lands, which are found all over the territory, cattle are reared, and much is being done to improve the quality of the animals by importation of good quality stock cattle from Great Britain. *Salisbury* is the capital. Over one-third of the gross national product of Rhodesia is exported. U.K. takes a quarter of Rhodesia's exports, the main ones being tobacco and sugar. The country's prosperity is dependent on trade and on purchase agreements and preferences from Britain and other Commonwealth countries. Her political disaffiliation from the Commonwealth in Nov. 1965 and the consequent economic sanctions imposed on her by the United Nations has without doubt affected her economy.

Somali Republic a small territory on the Red Sea. It has an area of 646,000 sq. km with 2.7 million population. It is of little economic importance and is more important politically as it occupies a position from which it can command the Red Sea. Some agricultural crops like barley and maize are grown mostly for local consumption. The chief wealth of the land is composed of sheep and cattle. Recent surveys reveal the presence of substantial iron ore deposits, and also of tin, gypsum, mica and coal. The exports are fresh fruits, livestock, hides and skin. *Berbera* and *Zeila* are the chief towns.

The Sudan, a sovereign independent republic, is the largest country in Africa and has an area of 2.5 million sq. km which extends from the frontiers of Egypt to Uganda. The population is estimated at 15.8 millions. The northern half of the country is a land of grass and desert where agriculture is possible only with the help of irrigation. The southern half of Sudan receives adequate rainfall and is a land of forests and swamps. The climate varies greatly from one region to another, and thus helps to produce different kinds of agricultural products. Cotton which is mainly of long staple variety, is the most important crop, which alone constitutes 76 per cent of the total exports of the country. Cotton is grown in the Gezira, a fertile tract of land between the Blue Nile and the White Nile. This region has been recently irrigated as the result of the construction of a great dam at Sennar in 1959 on the Blue Nile. The Sudan is the chief source of the world's supply of *gum arabic,* exports of which amount to 50,000 tons a year. Forests are abundant in the south and along the Blue Nile valley. Fibres, tanning materials and timber from mahogany and the acacia arabica are the chief forest products. The finest gum forests are in the valley of the Blue Nile. The middle portion of the Sudan is an extensive grassland where a good deal of cultivation and cattle-rearing is carried on. Rubber, coffee and gum are the other products coming from the middle region. The principal highway of commerce is the Nile. The railway runs from Haifa to Abu-Hamed and then goes to Khartum ; from Khartum a line runs to Port Sudan on the Red Sea. The railway system is owned and operated by the government. *Khartum* is the principal town. Port Sudan is the only sea-port of the country.

Small size of private capital, inadequate transport facilities, dearth of skilled labour, inadequacy of motive power and high cost of production are the major handicaps to rapid industrial development. The Government has been following a fairly liberal policy for local and foreign capital in the field of industry. For the last ten years, the economy has been growing at an average annual rate of just below 5 p.c., which is, without doubt, a satisfactory rate of growth. Since the population growth is 3 p.c. and there are vast opportunities for development, the economy should grow at a higher rate. The

present policy of the government is to include as much areas as possible for economic development to avoid regional imbalance. Sudan imports sugar, machinery, metal, cotton piece-goods, vehicles, tea, coffee, timber and wheat. Principal sources of imports are U.K., India, Japan and West Germany. India's share in the total import of Sudan is about 15 p.c. in terms of value. More than 80 p.c. of India's exports consist of cotton piece-goods, tea and jute manufactures. The exports are cotton, gum arabic and salt. Cotton accounts for 75 p.c. of the total exports. The buyers of Sudanese goods are U.K., Egypt, West Germany and India.

The Republic of South Africa comprises the Cape of Good Hope, Natal, the Orange Free State and the Transvaal. The total area is 1.2 million sq. km. The population in 1970 was 20 millions of which 6 millions were Europeans, 400,000 Indians, 12 millions natives, and 34,000 Malayans. The Bantus constitute the native population. In all the provinces of the Republic, the non-white peoples suffer under social, political and economic restrictions.[2]

The economic development of the Republic is the result of the discovery of minerals. The country is exceptionally rich in minerals.

The two most valuable minerals are gold and diamonds. As with other mineral producing countries, it was gold that set afoot the mining industry in South Africa. Along with gold, a prominent part was played by diamonds. South Africa is almost the only source of diamonds and is also a producer of more than half the world's total annual output of gold. For long, the economic structure of the country had been supported on gold mainly, and the falling off in output brought an insecurity of basis. New supports to the structure—both industrial and agricultural—were slowly built. The country is famous for the quality of its gem stones as well as industrial diamonds. The most famous diamond field is at Kimberley in the Cape

[2] The Government attitude which is predominantly influenced by the Dutch Nationalists is the reflection of the original constitution of the Transvaal Republic wherein it is stated that "there shall be no equality between the Black and the White, either in church or state."

In the presence of *dual economy* where the white and coloured workers receive two different rates of wages, and *apartheid*, the black industrial worker is at the mercy of his white employer's paternalism.

province. South Africa is also an important producer of manganese. The most important manganese deposits are in the Cape Province. More than half a million persons are employed in mining. South Africa has great potential wealth in her fisheries, but up till now they have not been fully developed. The most important is the catch of off-shore whaling which is conducted off the Natal coast. Despite the importance of gold mining, agriculture continues to occupy a key position in South African economy. About 215 million acres of land are under cultivation in South Africa. The principal agricultural produces are wheat, barley, oats, potatoes and Kaffr corn. The other products are tobacco, tea and sugarcane. Agricultural yields are, however, very low by international standards. South Africa's flourishing hide and skin industry provides it with one of its most important sources of foreign revenue.

There are 22,000 km of railway lines of which 50 p.c. are concentrated in the Cape and Transvaal. There are good motorable roads of about 42,000 km and they carry a large volume of goods and passenger traffic. The country has also an efficient internal airways system. Regional air services are operated to Lorenzo Marques, East Africa and Rhodesia. Johannesburg is an important airport. Europe-bound South African Airways aircrafts fly via Nairobi in Kenya. The principal sea ports are Durban, Cape Town, Port Elizabeth and East London.

One of the most notable features of South Africa's economy is the surplus capital which makes it difficult to contain the rate of expansion within the limits set by the limited supplies of skilled labour. Because of the scarcity of skilled labour, there is a severe strain on the services of transport and communication. The principal groups of industries are food, textiles, chemicals and machinery. About 25 p.c. of the foreign trade of South Africa is carried on with the U.K. closely followed by U.S.A. (20 p.c.) and Japan (12 p.c.). The exports consist of hides and skins, wool, cereals, fruits, textiles, machinery, chemicals, fertilisers and precious metals and stones.

Gold which constituted more than three-fifths of the total exports of South Africa in 1949, now accounts for only one-third in value. The emerging pattern of export trade is due to the greater industrialisation of the country.

There are four provinces in South Africa. These are the

Cape of Good Hope Province, Natal, Transvaal and the Orange Free State.

Nowhere in South Africa are racial attitudes more gentle than in the Cape of Good Hope Province. It is mainly a pastoral country. Good natural harbours are almost absent. Rivers are of little use for commerce. Fruits are grown on the south-western side where the Mediterranean type of climate prevails. Mineral wealth is considerable, specially diamonds. 90 per cent of the world's diamonds come from Kimberley. Wheat, oats, rye, tobacco and millets are the chief agricultural products. *Cape Town,* a port of call, is the capital. *Table Bay* provides natural shelter for shipping. The hinterland is rich in fruits. The port is also a railway centre and one of the great nodal points in the world's sea-traffic.

Natal. It is a land of perpetual greenness. *Natal is often described as the Garden Province of South Africa.* The climate is sub-tropical on the coast and somewhat colder inland, for which reason the region is admirably suited to Europeans. Agriculture is the chief industry of the province. Sugarcane, tea, tobacco, maize, coffee, cotton, rice and bananas are extensively grown. Coal is the chief mineral product. The quality of the coal is the best in South Africa. *Durban* is the busiest port in Africa and handles more traffic than all the other ports of the Republic combined.

The commercial life is also centred in Durban. The thriving tourist industry is based on a 300-mile stretch of beach with an all-year-round season, game reserves, inland fishing water and green mountains. *Petermaritzburg* is the capital.

In the Transvaal, gold, coal, iron, diamonds, platinum, lead, silver, tin and copper are the chief minerals. *The Witwatersand, which lies to the west of Johannesburg, acquired great importance in past years on account of the vast quantities of gold which it contains. The rocks consist of a "banket" in which gold lies in particles. Cheap local labour and the proximity of coal contributed to the rapid growth of this industry in the Rand.* The production of gold from most of the mines is on the decline. Of the 35 mines of the Rand—stretching from Springs to Randfontein—19 are expected to close down by 1972. 30 per cent of the world's gold comes from

this area. Along with the exploitation of gold, there has been a steady development of other resources. Transvaal's chrome deposits are the biggest in the world ; the uranium industry can go on even if gold mining is closed down. The coal is not of good quality, but still it plays a very important part in the industrial development of the country particularly in the heavy engineering production. The diamond mines lie near Pretoria. The important agricultural crops are sugar-cane, cotton and

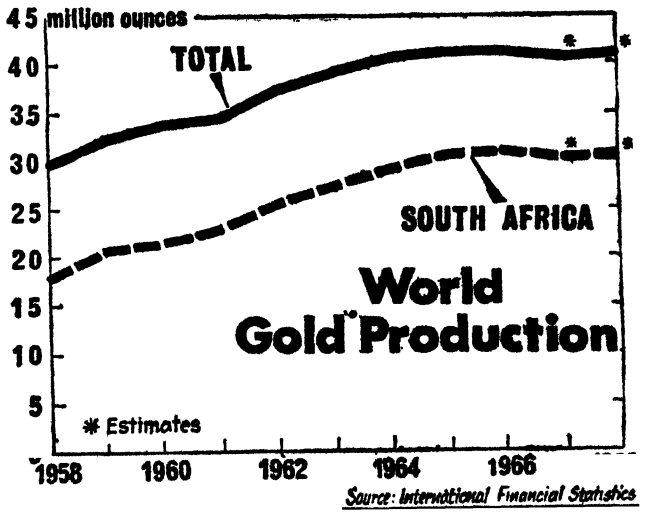


FIG. NO. 70. South Africa and World Gold Production

tobacco. Stock-raising is carried on in the high-Veld where cattle and goats are numerous. *Pretoria* is the capital with a population of 435,000. The steel industry is of recent development. *Johannesburg* is the largest city in South Africa and is the centre of the gold-mining industry.

The Orange Free State is a land of gold and food, coal and chemicals. It boasts of the world's richest gold field and rapidly expanding petro-chemical complex. Diamonds are mined in the West, and gold, uranium and coal in the north-west. The State produces 37 p.c. of the Republic's maize, 30 p.c. of its industrial milk, 29 p.c. of cream and 21 p.c. of both wheat and groundnut. It raises 36 p.c. of gold and 25 p.c. coal

of the Republic's total output in these two minerals. Cattle and sheep are reared on the high-Veld and also on the grassland in the east of the Province, where the dairy industry has developed. Wheat is cultivated in the south-east in the basin of the Caledon river, which has been called "the granary of South Africa". Maize and millets are also grown. Bloemfontein is the capital and the chief trade centre.

South Africa's export performance has long depended on three commodities—gold, diamonds and wool. Unless new gold fields are discovered or the prices of gold increase, this export will soon almost disappear. So is the case with diamond. Wool continues to be an important item of export. The other commodities are copper, canned fruit and wine. The country has a large volume of trade with U.K. South Africa is developing trade contacts with France, Italy, West Germany and Japan. South Africa's trade with the rest of Africa has been severely limited because of apartheid question.

Arab Republic of Egypt

Arab Republic of Egypt is situated at the head of one of the most important highways of commerce—the Suez Canal route—through which the trade of Asia with Europe is maintained. Egypt has, therefore, a great scope for developing entrepot trade. Geographically, she is the natural gateway between East and West. For long, through her passed the wealth and produce of many nations. In her prosperous cities were sold and exchanged the goods of the Far East, of Iran, Babylon and Arabia, of Somaliland and Sudan, of Greece and Rome and of Africa and Spain.

The total area of Egyptian region is 1 million square km which includes the Lybian Desert, the region between the Nile and the Red Sea and the Senai Peninsula. The population in 1970 was about 34 million. The climate of Egypt is typically that of desert with the exception of the Northern Delta region which has the Mediterranean climate. Ninety-seven per cent of the area of Egypt is desert. *Without the Nile, therefore, Egypt would have been as barren as the rest of the Sahara.* Of the total area, only about 23,000 square km of area (3 p.c. of the total land area) are cultivable by means of irrigation. Such

irrigated areas lie along the valley of the Nile. About 92 p.c. of the entire population of Egypt live in this irrigated part of the country with the result that the density of population here is the highest in the world, about 1,000 per square km. The other densely populated areas are the delta and the Suez Canal zone.

The climatic conditions of Egypt are such that, with the aid of irrigation, the land can be cultivated throughout the year. Agriculture is the main occupation of the people of which 70 p.c. depend directly on it. About 75 per cent of the national wealth is invested in the agricultural field, and about 60 p.c. of the State income is drawn from it. Agricultural practices in Egypt are a combination of the ancient and the modern. The hand sickle, the wooden plough, the threshing board and the water wheel drawn by animals exist side by side with great engineering works of irrigation, the disc plough, the tractor and the combine. In Egypt, the use of modern machinery on the farm has been restricted on account of the abundance of cheap labour and the predominance of extremely small firm units. Cotton, sugarcane, rice, maize and wheat are the principal crops. Cotton is the most important crop on which much of the country's prosperity depends. Cotton accounts for 75 per cent of the value of the country's exports. Almost the entire output comes from the southern part of Egypt where irrigation works are highly developed. The quality of cotton is superior to that produced in India. Since the beginning of the 19th century the economy of Egypt has been dependent on cotton. Recently, Egypt has been facing serious competition from other countries in respect of finer varieties of cotton. Cereals like rice and wheat occupy about 40% of the crop area.

Though Egypt normally raises about 200,000 tons of rice a year, the country has not yet become self-sufficient in food. It imports about 400,000 tons of wheat every year.

There has been no balance between agricultural production and growth of population. The cultivated land rose by 20 p.c. during the last fifty years, while the increase of population was about 96 p.c. during the same period.

The mineral wealth of Egypt is found in the deserts. Petroleum and phosphates are known to exist in considerable

quantities. Egyptian oil output has been steadily increasing from wells along the Gulf of Suez and in the Sinai Peninsula.[3] There are eight oil-fields of which the main supplier is at Ras Gharib, yielding 1,800,000 tons per year. The other oil-fields are Asl, Sudr, Ras Matarma and Firan. A new oil-field has recently been found at Ras Sadr, on the opposite side of the Red Sea. The petroleum production in 1969 was 13 million tons. The next commodity in importance is the phosphate salt mined along the North-East coast of the Red Sea. Most of the phosphate is exported to Australia and South Africa. The other minerals are salt, ilmenite, gypsum, low grade manganese ore, talc and building stones. Prospecting is under way for coal, iron ore, zinc and lead.

The manufacturing industries of Egypt are mostly concerned with textiles, sugar, cement, foodstuffs and chemicals. The country is now self-sufficient in respect of cotton piece-goods, sugar refining and brewing. Cigarette making and cement production are also important. All the industries are confined to Cairo and Alexandria.

There has been a considerable expansion of consumer goods industries. In fact, 79 p.c. of the present gross value of manufacturing output is from textile and food products. Small-scale manufacturing is still an important feature of the industrial sector in Egypt. With the growing demand for industrial goods, the balance of payment position has become strenuous, and the financial position is maintained by taking substantial loans from International Monetary Fund.

"Egypt is the gift of the Nile", for to the Nile she owes her agriculture and the glory of her history. *The Nile is of great importance to the life and prosperity of Egypt.* The main river which flows through Egypt is formed by the union of two principal branches, the White Nile and the Blue Nile. Rising in Lake Victoria on the high plateau of East Africa, the White Nile flows northwards along a flat region. The White Nile has a flow of water throughout the year. The Blue Nile rises in the Abyssinian mountains. In summer, the Blue Nile is in flood. The two rivers join at Khartum and flow through Egypt to the Mediterranean Sea. It is navigable without impediment

[3] The Sinai Peninsula is in the occupation of Israelis since June 1967.

as far as the Aswan Dam. Since earliest times the Nile has been the principal transporting medium in Egypt.

The Aswan reservoir can hold 5,500 million cubic metres of water. There is another dam across the Nile at Sennar, 3200 km from the mouth of the river, for benefiting the Sudan along the banks of the Blue Nile known as the Uazira. The Sennar dam is responsible for irrigating 100,000 hectares of land and has converted an arid desert into a rich cotton growing country.

The Government has prepared a ten year plan for the construction of a high dam on the Nile to the south of Aswan Dam to increase the total arable land in the country from 6 million acres to 3 million hectares. The capacity of the new dam will be 130,000 million cubic metres as against 5,000 million c.m. which is the capacity of the Aswan Dam. The dam will be known as *Saad el Ali* (High dam). Its hydro-electric power will feed a giant fertilizer factory and a network of smaller industries over a wide area. The project envisages the construction of a main dam 365 feet high and three miles long to form a 1500 square km lake, the largest man-made lake in the world. A power station at the dam will have a generating capacity of 750,000 kw.

Egypt has some 6000 km of railway. The railways are worked by the State. The principal line runs from Alexandria to Aswan. From Cairo an important line runs southward and joins the Sudan railway. The double-tracked line running from Cairo to Alexandria is the most traffic-congested. Navigable rivers and canals now total about 3,500 km. The Suez canal is of greatest economic and strategic importance to Egypt.

The Suez canal is of vital importance to Egypt in as much as it provides annually more than £86 million to the Government as receipts from toll rates. The closure of the canal since 1967 has put great strains on the revenues of the State.

The two special features of the foreign trade are (*a*) the excess of visible imports over visible exports, and (*b*) the export of raw materials and import of manufactured goods.

The chief export of the country is cotton, which alone accounts for over 80 per cent of the total value of the exports. Other exports are rice, sugar, oilseeds, and crude petroleum. The principal buyers are U.S.S.R., Czechoslovakia, China, India, Eastern Germany, and Western Germany. The principal imports are machinery, iron and steel, wheat, motor cars, and

fertilizers. Consumer goods and luxury items are not imported. There is high priority for the import of capital equipment. U.S.A. is the leading supplier, followed by U.S.S.R., West Germany, U.K., India and Japan. India's share in the import of U.A.R. is 3 to 4 p.c. Egypt has also trade relations with other Arab countries.

Cairo is the capital of Egypt. It is also the largest city in Africa. It stands on the east bank of the Nile at the head of the Delta. Recently it has become an important airport for the Europe-Asia route. *Alexandria* is a port noted for foreign commerce and handles about 80 p.c. of the country's export trade. *Port Said,* on the northern end of the Suez Canal, is a great coaling station with large entrepot trade.

Ethiopia and Eritria

The Federal Empire of Ethiopia and Eritria, situated on the north-east African coast, has an area of about 850,000 sq. km. with about 25 million population. The country is a volcanic tableland, and the climate is healthy and stimulating. Economic progress is slow in spite of considerable mineral, agricultural and pastoral resources. The country has no sea-coast and depends on Djibouti, a port in Somaliland, for its foreign trade.

The country in future can be a great cotton-producing one. The important agricultural crops are coffee, wheat, cotton, barley and pepper. About 90 per cent of the people are engaged in agriculture. In its rugged hills and valleys the existence of considerable mineral wealth has been reported recently but lack of communications has prevented its exploitation. Transport is extremely difficult by rail and river. There is a railway line from Djibouti to Addis Ababa—a distance of 700 km. Another 300 km long railway line runs from Massawa to Asmara. The country has rich deposits of iron, coal, copper and sulphur which are not yet industrially or commercially exploited because of the lack of technical personnel, capital and transport facilities. In the north-eastern part of the country, the deposits of potash salts exist in large quantities. The country is making vigorous efforts for improvements of agricultural implements, plant breeding, cattle-raising methods and cottage industries. Exports from the country consist

mainly of hides and skins, coffee, wax, gold and oilseeds. Two-fifths of the export are received by the U.S.A. About 10 p.c. is taken by Italy. The other important buyers are U.K., Saudi Arabia, Aden, Ceylon and French Somaliland. Machinery and metals account for 20 p.c. of the imports, followed by cotton piecegoods with 15 p.c. share. The other imports are motor vehicles, petroleum products, and foodstuffs. India exports cotton textiles, jute goods, tea, carpets and blankets. *Addis Ababa* is the capital of the Empire and is situated at an altitude of 8,000 ft. *Asmara* is the capital of Eritria. The chief port is *Massawa* in Eritria. The other trade centres are Adowa and Gondur.

Algeria and Tunisia are the most important States of North Africa. They consist of a coastal range. Agriculture is the main occupation of the people. By means of artesian wells the land is irrigated for raising vine, cereals and tobacco. The basis of Tunisian agriculture is cereals, but the most prosperous sector of agriculture is *tree culture* for olives, citrus fruits and date palm. In Algeria, where one-third of the cultivated areas and most of the irrigated land are held by Europeans, wine grapes are by far the most valuable crop. Petroleum production in the Algerian Sahara is a very recent event. About 48 million tons of crude oil were raised in 1969.

Algeria has large deposits of iron ore, the annual production of which is a little more than 2·5 million tons. The principal exports are citrus fruit, dates, hides and skins, tobacco, wine, cereals, olive oil, iron, zinc and lead. More than 85 p.c. of the exports is received by former French West Africa. The next important buyer is U.K. with 5 p.c. of the share of exports. The chief imports are textiles, machinery and hardware. The most important items of export from India are dyeing substances, bags and sacks for packing, unmanufactured tobacco and black pepper. *Algiers,* the capital of Algeria, is an important coaling station.

Algeria has an area of 295,000 sq. km with 14 million population. Because of the Mediterranean climate, Algeria grows wheat, barley, grapes and citrus fruit. Some minerals like natural phosphates, iron ore and zinc ore are found. About 60 p.c. of the export goes to France and 4 p.c. to Italy.

Tunisia is an Arab state in Africa with strong cultural and economic ties with Europe. Tunisia is a small country with less than 5 m. population. It has an oil industry of its own. Two-thirds of the people live by agriculture. For reasons of tradition, language and cultural affinity, France has remained the only dominating trading partner of Tunisia.

QUESTIONS

1. Discuss the present economic condition of South Africa with special reference to its (*a*) mineral resources, (*b*) pastoral indust.

2. "Egypt is the gift of the Nile."—Discuss fully.

3. Carefully examine the geographical position of Egypt in relation to world trade routes.

4. Account for the commercial and industrial backwardness of tropical Africa.

5. "The gold-mines are the backbone of South Africa." Discuss the statement.

6. Discuss the present position of economic development of Abyssinia.

7. Trace the course of the Nile from its source to the mouth, and show to what extent does this river help in the development of agriculture in Egypt. (Cal. Inter. 1951).

8. "The economic development of South Africa has been based on mineral discoveries." Examine the statement. (Cal. Inter. 1952)

CHAPTER XIV

AUSTRALIA[1]

The Island-Continent of Australia, situated entirely within the South Hemisphere, is rather off from the main trade routes of the world. About 40 per cent of the area is in the tropics and the rest in the temperate zone.

Generally speaking, the surface of Australia is fairly level, consisting of either plains or plateaux of great extent. In the east, however, a continuous range of highlands runs from north to south for over 2,000 miles. This range is known as the Great Dividing Range. Its distance from the sea varies from 25 miles to 120 miles. The coastal plains are, on the whole, very fertile. In between the Great Dividing Range and the Western tableland are the lowlands. Thus Australia looks like a soup plate—a fertile rim around a desert bowl.

The coast-line of this vast island-continent is generally regular. The eastern side and, to some extent, the north-western side are more or less indented.

The east coast receives abundant rainfall. Northern Australia, which enjoys monsoon winds in summer, also gets a plentiful supply of rain. The central part and the west coast of Australia never receive rain-bearing winds and so these parts, collectively, are called the *"dead heart of Australia"*. Speaking generally, more than two-thirds of Australia have on the average less than 20 inches of rain a year.

The continent can be divided into two parts—*Empty Australia* and *Economic Australia*. The line that separates the two runs from "Geraldton, West Australia, passing through Kalgoorlie, Port Augusta, Broken Hill and to the gulf of Carpentaria". To the north-west of this line lies the dry country which is either useless desert or purely pastoral land of an uneven quality. To the south and east is found the great farming belt extending from Cook Town in Northern Queens

[1] All statistics are from the Statesman Year Book 1971-72, an Statistical Year Book 1970 by U.N.O. (1971). Also, see Copland, D. B. Australia's Economy; Taylor, G.: Australia.

land to the coast through New South Wales, Victoria and South Australia to Fowler's Bay. About 55 p.c. of the land area of Australia is used for pastoral purposes, 40 p.c. is wasteland, while 2 p.c. is forest and only 3 p.c. is crop and orchard land. If proper steps are taken for irrigation, it may be possible to bring ¼th of the land area under cultivation.

The Continent occupies about 3,000,000 square miles. It has been estimated that the mid-year population in 1970 was 12.5 millions, "the bulk of which live in a narrow belt running from a little north of Sydney round the coast of Adelaide and in the south-west corner".

The average density of population is 375 per 100 square miles.

Immigration has greatly helped the growth of population in Australia, although recently the natural increase has become larger than the gain from immigration. Before 1852-61, immigration accounted for 76 p.c. of population growth in Australia. Since then, immigration rate has declined. The percentage of growth, however, between 1922-1931 from immigration was only 26. Today, Australia depends mostly on natural increase of population. The Australian government gives first preference to the British for immigration.

The density of population is nowhere high, except in Victoria. The climate and other factors have led to a very definite concentration of population in the east and south of Australia. The waterless wastes of the centre and west of the continent cannot attract settlers. But there is definitely scope for closer settlement in Queensland, New South Wales, Victoria and South Australia. There is a movement to encourage people to "go west" which offers unique opportunities for development of various resources. Further, the Western Australia is nearer to the markets of Asia and Africa. Also, it has cheaper land and plentiful supplies of iron ore, bauxite, gold and manganese. Lack of coal and distance from the eastern part of the country are the only drawbacks, today.

There is opportunity for the population to increase many times its present figure. Indeed, lack of labour is a handicap to the development of industries. Again, though the northern part is very fertile and suitable for the cultivation of rice, sugar and cotton, the Europeans cannot carry on work there as the

region is within the tropics and hence, very hot. Nor does Australia encourage immigration of Asian labour. The immigration policy, known as *White Australia policy,* has two aspects: to attract economically and socially desirable immigrants and to exclude or limit in number those immigrants who are considered undesirable. *The policy is based on two considerations: sociological and economic.* The sociological consideration is directed against those who are considered incapable of assimilation and to all Asians and even to people from southern and eastern Europe. The economic consideration is the fear that immigration will lower the Australian standard of living and existing wages. Apparently, the policy contains no suggestion of racial bias. The "White Australia" policy may postpone the development of the northern portion of the country till the White settlers sufficiently acquire knowledge and capacity to conquer tropical diseases. The immigration policy of Australia did not raise much sensitiveness in Asia in the past because of two factors. Australia was not—until the World War II—considered even remotely a portion of the Asian Continent as the people were mostly European there. Secondly, South-East Asia was much too busy in throwing out European Imperialism.

The role of transportation is yet to become of greater significance in the development of industries in Australia. In spite of the immense distances, the fact that the population is more or less concentrated in the south-east of the continent, has discouraged the extension of roads and railways in the other parts. *Australia is deficient in waterways.* The rivers of Australia are short and rapid. The Murray, the most important river, is in the south. The tributaries are the Darling and the Murrumbidgee. Although the length of the Murray is 1,300 miles, it is of little use for navigation. During the rainy season steamers can ply between Albury on the Murray and Bourke on the Darling. Australia has a little more than 500,000 miles of roads. The railway system is being gradually developed. One serious defect in the railway system is that different States adopt different gauges on which the lines are built. These involve many changes. Australia has a railway mileage of about 26,000 which is distributed as follows: New South Wales (6055), Victoria (4,265), Queensland (6,077), South Australia (2,535),

Western Australia (3,797), and Tasmania (516). There is one trans-continental line running from Perth to Port Augusta, the distance being 1,425 miles. The climate and relief of the country also permit easy development of air-traffic. There is a little more than 52 million route miles of air services in Australia.

Of the total of 21 million cultivated acres in the country more than half is under wheat, which is a winter crop and is reaped in early summer. The chief wheat-growing areas are in the fertile plains of the Murray basin and in the Mediterranean areas. In 1968, the wheat production was 10 million tons. The major portion of Australian wheat goes to the United Kingdom, but some of it is also sent to China and Japan. Adelaide is the chief wheat exporting centre. Next to wheat, maize, barley, sugar-cane, oats and rice occupy the largest area. Australia grows a little more than one million tons both of barley and oats separately. Rice has become an increasingly significant crop in Australia with 250,000 tons a year currently in New South Wales.

Of late, Australia has become an important producer of sugar-cane which is grown extensively in Queensland. Restrictions are being removed which previously allowed only two-thirds of the cane areas to be cultivated.

From the point of view of land use, Australia is more suitable for pastoral than agricultural industry as three-quarters of the country are too dry and hot for agricultural pursuits. Most of this dry, hot country can rear some livestock.

Today, sheep and cattle rearing are the two great livestock industries of the country. *Sheep-rearing is very important in Australia, where the number of sheep exceeds that of any other country except Russia.* Sheep are reared mostly for wool in New South Wales, Queensland, Victoria, Western and Southern Australia. Both in respect of number of sheep and quantity of wool, Australia occupies the most leading position. The U.K. is the single largest customer of Australian wool, taking, as she does, more than 30 per cent. France, Japan, Belgium and West Germany are the other buyers. Cattle are reared for beef and dairy produce in Queensland, Northern Territory, coastal lands of New South Wales, Victoria, and the south-west of Western Australia. The U.S.A. is the main customer of

Australian beef and veal. Almost all the meat going to the U.S.A. from Australia is in boneless form—third quality standard meat for making sausages and hamburgers. Presently Australia is passing through a crisis in woollen production because of synthetics. The future envisages a smaller, a less prosperous and a differently structured woollen industry.

The mineral wealth of Australia is considerable. More than million persons are employed in the mining industry. In the beginning gold was the chief metal which attracted immigrants to Victoria and New South Wales. Even now gold is an important product of Australia, where more than 4 per cent of the world's total production is raised. In Victoria the chief gold centres are Ballarat and Bendigo. New South Wales is now-a-days less important for gold. In Queensland, the chief gold mining centres are Charters Towers and Mt. Morgan. At present more than half the total production comes from Western Australia, where it is worked in two main centres—Coolgardie and Kalgoorlie. Since these two centres are in the desert, mining has been made possible by carrying water supplies.

Coal is the most important mineral product of Australia. It is found in New South Wales, Queensland, Tasmania, S. W. Australia and S. E. Australia. Coal output in 1969 was more than 43 million tons. *Iron ore* occurs in South Australia. Australia's annual production of iron ore is a little more than 24 million tons. *Silver* is found in many parts of the continent. The most important *silver* mines are found in New South Wales, where it is worked in the Broken Hill district. *Lead* and *zinc* are also obtained from the silver mines of the Broken Hill. European Common Market and the U.S.A. are the leading buyers. *Tin* and *copper*—though abundant—are not worked efficiently at present. The most important copper mines are found in Northern Queensland and South Australia. Of precious minerals, *diamonds* and *sapphires* are found. Australia may well become one of the world's richest sources of uranium for atomic energy. The known deposits are in Radium Hill (South Australia), Inverell Gulagi (New South Wales), Mary Cathleen (Queensland), and Rum Jungle (Northern territory).

Australia is looking forward for an era of expanding prosperity for its mineral industry based on many discoveries already made. The export horizon is being broadened to include Europe as a buyer of Australian iron ore. The iron ore production has increased so much after 1960, that despite expansion of domestic Steel production, the country will have a large surplus of iron ore for export. It has been estimated that production of bauxite will be 25 million tons per annum by 1975, half of which can be exported. In near future Australia is to become a great producer of nickel and a large exporter of coking coal. Manganese, and tungsten are other two minerals which hold out immense possibilities in Australia. The future is also promising for oil and gas.

One of the world's biggest hydro-electric projects is now under way in Australia. It will double the Continent's power potential and greatly add to the world's food supplies. This is the Federal Government's £A200 million Snowy-Mountains hydro-electric and irrigation scheme. It will have an installed plant capacity of at least 2,620,000 kilowatts, impound 400,000 acre feet of irrigation water and provide power for key defence research projects in an easily defended area. The completed scheme will rival the famous Tennessee Valley Authority of the U.S.A. and take at least 20 years in the making. In the rivers of the plain rushing water will generate electricity equal to the total output of all steam-power stations in Australia today. After driving he power stations the water will be used for irrigation.

For long, the development of manufactures was hindered by scanty and widely scattered population, poor progress of railroads and the overwhelming predominance of agriculture and mining. The great distance of the continent from Europe was also a handicap. Within recent years, Australia has developed a wide variety of manufactures by policies of high tariff protection and subsidies to local industries. The World War II also gave a tremendous boost to Australian industries.

Manufacturing is now Australia's single biggest economic activity, employing more than the agricultural, pastoral and mining industries put together. The engineering and metal industries have forged ahead of the others and they employ about 350,000 workers. New industries include the manufacture

of motor cars, tractors, earth-moving equipment, newsprint and rayon-weaving. Flour-milling, weaving and spinning of wool, furniture-making and iron and steel are the important industries. This last group is of special interest for the future of manufacturing as Australian steel is as cheaply produced as any steel in the world.

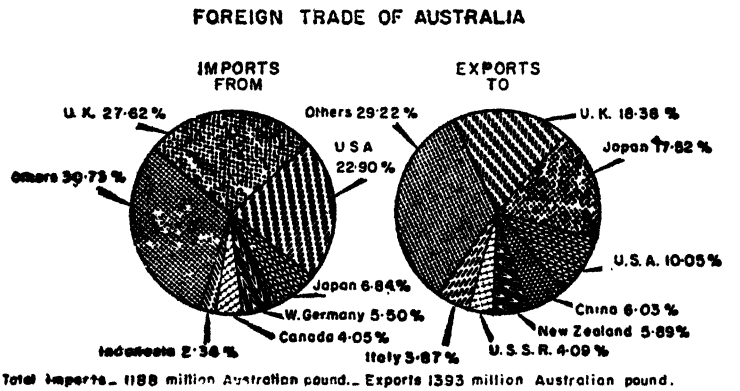


FIG. No. 71. Foreign Trade of Australia

The most important exports of Australia are wool, wheat, gold, hides and skin, butter, flour, cane sugar, frozen meat, mutton, fruits, wine, cheese, metals, machine tools, machinery and engines. Australia's rise to a prominent place among world sugar exporters has been very recent. Japan and U.S.A. are the two important buyers of Australian sugar.

U.K. is the single largest buyer of Australian goods and takes about one-sixth of the total. Japan's share is about the same. *Melbourne* is the capital of Victoria and is the chief seaport and the manufacturing centre of the State. *Sydney*, the capital of New South Wales, stands on the south of Port Jackson. It possesses a fine harbour. Besides being the industrial and political centre, it is also the chief naval station in Australia. *Brisbane* is the capital of Queensland. It is the chief port and industrial centre of the State, and wool, frozen beef, butter, bacon, ham, pork, hides and fruits are exported from there. *Adelaide* is the capital of South Australia. Its port is Port Adelaide. The chief exports are wool, wheat, flour, copper,

skin, frozen meat, fruits and wine. *Perth* is the industrial, commercial and political centre of Western Australia. Its port is Freemantle. The exports are mainly wool, gold and timber. *Hobart* is the capital and chief railway centre of Tasmania. It has a fine harbour and has trade mainly with Sydney. The exports are wool, gold, tin, silver, timber, fruits, jam and grain.

NEW ZEALAND

New Zealand includes North Island, South Island and Stewart Island and several groups of small islands lying at a distance of 150 to 350 miles in the surrounding seas. The total area is 103,723 square miles and the population 2·9 millions. About 93 per cent of the population is European. Immigration played a very important part in the growth of New Zealand's population till the late seventies of the 19th century because of the extensive activities of the colonising companies and the gold rush. Most of the immigrants were from Britain. *New Zealand is sometimes called "the brighter Britain of the South."* It is the only member of the Commonwealth that resembles Great Britain in its life and habits, scenery, temperature and size. The British emigrants have now permanently settled in New Zealand and they comprise nearly 95 per cent of the white population. Pure *Maoris* who were the original inhabitants of the country constitute only 4 per cent of the total population. Anglo-Maoris account for 2·5 per cent.

The temperature and rainfall of New Zealand are mainly controlled by the fact that the greater part of the Dominion lies within the influence of the sea. Summers are not very hot, nor are the winters cold.

The surface of all the islands is highly mountainous. In the South Island, there is a mountain-range from south to north on the western side. This range is known as the Southern Alps and it is covered by perpetual snow. The most extensive plains in New Zealand are those called the Canterbury plains which occupy the middle of the South Island on the western side. *New Zealand is essentially a pastoral country and 90 per cent of its utilized land serves pastoral industries.*

In 1969, New Zealand had 60 million sheep, 8·6 million cattle and a little more than half a million pigs. Because of the

mportance of the products of sheep in the economy of New ealand it is said that "the uncrowned king of the country is he sheep." For many years, the sheep held supremacy in value f exports (wool, meat, tallow, pelts etc.) by a large margin. In cent years, however, beef, butter and cheese have increased reatly in value. In New Zealand the number of sheep per quare mile is greater than in any other country of the world. Mild climate and rich pastures, coupled with the introduction f refrigeration and the utilisation of by-products, have made heep farming very successful. On all the plains of New ealand the sheep is extensively reared for wool and mutton. The Canterbury plains with the surrounding downs are the famous fields for sheep-rearing, where more than one-fifth of the flocks of the Dominion are found. Normally the export of raw wool accounts for more than one-third of the total value of exports. The rearing of cattle for the meat and dairy produce has become, of late, very important. The dairy industry of New Zealand is run on a co-operative basis and is strictly supervised by the Government "to ensure that no goods are exported which will damage the reputation for good produce which New Zealand holds". On a production-cost basis, New Zealand's dairy industry is the most efficient in the world, and does not require government subsidy.

The total area under cultivation is a little less than 20 million acres. The chief crops are wheat, oats, barley, potatoes and fruits. The average yield of grain crops per hectare is exceedingly high (*e.g.* wheat 3700 kg ; oats 3000 kg ; and barley 360 kg). Of minerals, New Zealand has small quantities of many. Lignite, silver, gold, and petroleum are obtained, though, with the exception of coal, these are not highly developed. Power for the industry is mainly obtained from natural stream which occurs in several areas from the volcanic region of North Island.

New Zealand is largely dependent upon overseas sources for their manufactured goods. The second World War presented both a challenge and an incentive to the expansion of domestic industries. The falling off of imports, difficulties of shipping facilities and the demand for increased local production had a healthy incentive to industrial development. Though industrial activity in New Zealand increased during the War period, expansion was hampered by lack of capital and also the difficulty of

obtaining supplies of iron and steel, machinery and machi tools. As a result, her industry continues to be mainly concern with the treatment of her primary products, meat freezing a preserving, butter and cheese, saw-milling, fruit preservin brewing etc. Sparse population and distance from great ind trial countries prevent her from becoming a great manufacturi country. Leather-goods, woollen and flax manufacture, pu and paper, aluminium and machinery are some of t important industries.

Although the rivers of New Zealand are numerous, the are, for the most part, unfit for navigation. New Zealand h over 3,500 miles of railway, which has been greatly influenc in direction by relief features. The mountainous relief of t country has necessitated the construction of tunnels frequent at great expense. Roads are fast developing in New Zealan and at present there are 60,000 miles of roads.

The pastoral character of New Zealand's development c be seen from exports like wool, butter, frozen meat, cheese, hid and skin which account for nearly 90 per cent of the total val of her exports. The chief imports are motor cars, oil, timbe cigarettes, iron and steel plates, manufactured cotton and wi for fencing. The country has the greatest trade relations wi Great Britain. New Zealand has to rely on U.K. for more tha 50 per cent of her exports while nearly the whole of her impo trade is confined to the Commonwealth. The next importa country in New Zealand's trade is Australia. New Zealand tak about £5 million worth of goods a year from India. The oth countries with which New Zealand, has trade relations are t U.S.A., France, Japan and Germany (West).

The chief trade centres are Wellington, Auckland, Dun din, Christchurch, Nelson and Invercargill. *Wellington* is t capital of the Dominion and is situated on *Port Nicholson* i the North Island. It is the most important collecting a distributing centre of the country and handles a large coast traffic. *Auckland* is the largest town in New Zealand. As is situated on a narrow Isthmus of the North Island, it h become important for sea-traffic. Dairy produce is an impo tant item of export. It is the centre of the gum-collecting a gold-mining industries. *Dunedin* is the principal town of t South Island. *Invercargill* is another chief town of the sam

land. *Christchurch* is an important town of the Canterbury lains of the South Island.

QUESTIONS

1. Outline the outstanding geographic factors which have determined ustralia's eeconomic develeopment.

2. Describe the principal industries of Australia, including agri- ılture.

3. What are the principal exports from Australia and New :aland ? Discuss the possibilities of increased exchange between these)untries and India.

4. Discuss the development of least and west coasts of Australia nd show how far the influence of climate is responsible for such evelopment. (Cal. Inter 1952).

5. "Isolation and a small population have been potent forces in :tarding the development of Australia." Discuss this statement.

6. Account for high density of population in the south-western parts f Australia.

7. Describe and account for the distribution of population in ıustralia, and estimate the reasons of its population scarcity.

8. In recent years the commercial progress of Australia has been emarkable. How has this been possible ?

9. Australia has made rapid progress in developing the industry of ood preservation. How has this been possible and which countries are ıer buyers ?

10. Write an explanatory account of the different types of pastoral ccupation to be met with in Australia and New Zealand.
(Cal. I.Com. 1956).

CHAPTER XV

ASIA[1]

Asia is the largest and the most populous of the continents. With an area of about 17 million square miles, Asia occupies nearly one-third of the land surface of the globe. It has the shape of an enormous triangle and extends from the Arctic to the equatorial zone. Asia's population, which is more than half of the world's total, is mostly confined to the south-eastern region. South-East Asia accounts for one-sixth of the total area of the world and 55 p.c. of the world population.

In Asia there are certain disadvantages that have arisen from her physical environment for the development of industry and commerce. While a great part of Europe is within easy access of the sea, Asia is a huge compact mass, and a great portion of her central part is far removed from the sea, feeling no equalising influence and having little access to it. Much of the interior of Asia is still inaccessible by roads and railways as the physical features have their impact on the development of transport. The north is separated from the south by a series of high and massive mountains radiating from the Pamir Plateau. From the Pamir the Himalayas, the Karakoram, the Tien-shan and the Altai mountains extend to the east, and the Hindukush and the Sulaiman mountains to the west. Again the east is cut off from the west by deserts and mountains. Communication, therefore, between the east and the west as well as between the north and the south, is difficult and in some places not possible. The northern side, which covers more than half of the continent, has a climate unsuitable not only for agriculture, but also for human health and efficiency.

Yet, in many ways Asia enjoys certain definite advantages

[1] The suggested readings in Asia are: Cressey, G. : Asia's Lands and People. McGraw Hill, 1951 ; Bergsmark, D. R. : Economic Geography of Asia, Prentice Hall, New York ; Stamp, Dudley : Asia, A Regional and Economic Geography, Dutton, London : Lyde, L. W.: The Continent of Asia, Macmillan, London ; Spate and East : The Changing Map of Asia, Methuen, London, 1950 ; The Far East and Australasia, 1969, Europa Publications Ltd., London ; Gunnar Myrdal, Asian Drama: An Enquiry into the poverty of Nations.

for the development of commerce and industry. It touches Africa on the West through the Isthmus of Suez, merges with Europe through the Caucasus, the Ural River and the Ural mountains and reaches out toward North America to the east. This contact with three continents of the world encouraged migration, spread of culture and development of trade from the remote past. Secondly, there is a wide belt in the South-East embracing India, Bangladesh, Burma, Malaysia, Viet Nam, Thailand, Coastal China, Cambodia and Japan which has rivers, rainfall, plains and appropriate soils for agriculture. Thirdly, the continent has a variety of mineral resources, in some of which she is the leading producer. Fourthly, her ocean frontiers are impressive, and except for the north provide outlets for commerce. Finally, the rich culture of the continent as manifested in her religions, art and architecture, astronomy and her inventive skill constantly inspire her people to come to the forefront again in the present-day world.

In 1970, the population of Asia was 2017 millions out of world's total of 3592 millions. The average density of population in Asia is about 70 per square mile. The distribution of population is very uneven in Asia. Population is very dense in the Indo-Gangetic plains of India, coastal China, Japan and Bangladesh where one finds more than 100 people per square mile. High plateaus of Central Asia and Arabia as well as the cold regions of North Asiatic Russia and the Himalayan region have low density of population. Thus, the distribution pattern of population in Asia has been very much influenced by climate and the physical features, both of which also determine the possibilities of agriculture. Broadly speaking, the agricultural regions in South-East Asia are densely populated. In densely populated areas the rate of natural increase per annum is also high. The three determinants of population trends—fertility, mortality and migration—indicate a condition of "population explosion" in Asia. The rate of birth in most countries is high in terms of economic development ; mortality rate from diseases is on the decrease because of improved health facilities without a corresponding increase in food supply ; and political and economic reasons do not influence emigration. In Europe, the surplus population during the 19th century migrated to the American continent, while in Asia, the surplus population

never found an adequate outlet in new lands mainly because of the attitudes of people as against the Asians.

The huge population of South-East Asia is at the root of many economic and social problems. Any increase in national income is entirely absorbed by a population increment, and therefore standard of living continues to be low. The people of Asia outside Japan share between them less than one-twelfth of the world's income, thus giving a unity in poverty that distinguishes them from Australia and New Zealand, the nearest affluent neighbours. The economies are undiversified, characterised by weak secondary industry. Population growth can give an abundant supply of man-power as well as an increased consumer demand provided industrialisation is advanced side by side for higher income and more employment. The economic growth in the South-East Asia is being hampered not so much by the population growth as by the low process of industrialisation.

Agriculture is the traditional source of livelihood and the largest single source of wealth. Yet it is a large food importer. In the production of rice, millets, tea, oilseeds, sugar-cane, rubber, cotton, tobacco, cinchona, silk and soyabeans, Asia occupies a high rank among the continents of the world. About 70 per cent of the world's production of rice comes from Asia. *Asia has almost a monopoly in the production of tea, jute and plantation rubber.* In the production of cane sugar, Asia contributes about one-third of the world's total cane sugar. Her position in cotton production is second among the continents.

Although all the countries of South-East Asia are mainly dependent on agriculture, not much was done to develop agriculture in the past because of the colonial system which encouraged plantation and other crops for export, *e.g.* tea in Ceylon ; cotton, jute and tea in India ; rubber in Malaysia. All these countries and many others are modernising their agriculture to attain self-sufficiency in food and to give a solid foundation for industrialisation.

Asia has vast deposits of many minerals of industrial value. Coal, iron ore, petroleum, copper, tungsten, antimony, tin, manganese, lead, graphite and precious stones are the principal minerals. Malaysia produces more than 30 p.c. of the world's tin ; Urals is the chief source of platinum ; the largest deposits

of world's manganese are in the Caucasus region ; the continent has four-fifths of world's anthracite coal ; the Middle East is the world's richest petroleum field ; the valley of Tigris-Euphrates has large deposits of copper, iron and sulphur ; India is vastly rich in iron ore and manganese ; and the richest known coal deposits are in China.

In most of the countries, industrialisation of the post-war period started with steel mills, power generation, chemicals and engineering industries. Of late, light industry and consumer goods constitute an important part of economy in most countries. With the exception of China, industrial ownership is shared both by the governments and private sectors. Assistance for industrialisation is being obtained from the West in loans, export earnings, investment and technical know-how. Many international organisations like Colombo Plan and ECAFE are giving co-operation and encouragement to Asian countries outside China. Some countries rely heavily on aid and investment, and others on the intensity of their efforts, supplemented by foreign aid and investment.

JAPAN

Japan is the third biggest industrial country in the world following the U.S.A. and U.S.S.R. Japan proper has the shape of a banana fruit and consists of four main islands of Hokkaido, Honshu, Kyushu and Shikoku. These four islands have an area of 370,000 sq. km. The country is mountainous and lies in the earthquake zone in the monsoon region. Japan lies entirely within the temperate zone, and enjoys a far milder climate than the neighbouring mainland lying under the same parallels of latitude. The climate of Japan, broadly speaking, is a mixture of continental and maritime elements.

Japan is remarkable for the length of its coast-line which is approximately 25,000 km and gives a ratio of 2 km of coast to 18 sq. km of land. Most of the lowlands which are areas of dense population and large-scale production have sea-frontage. Consequently the people have a maritime outlook. Unfortunately, however, deep indented coasts where natural harbours are many, have in general hinterlands of rugged terrain, and are therefore unsuitable for the development of major ports.

Even at the estuaries, sediments are deposited, necessitating constant dredging operations to permit ships to reach the river entrance. There are a few rivers in Japan and none of them is practically good for navigation, for their course is short and they run through mountain slopes. However, they are useful for irrigation and as sources of power.

Causes of Japan's Progress

Japanese economy has the dynamism and ability to overcome obstacles, and the country has already become a creditor nation which gives her responsibilities and privileges in the modern world. In the post-war expansion, the government maintained a walk-run pattern in which ultra-rapid expansion was followed by phases of slower growth to reduce stresses in the balance of payment. An analysis of the factors behind Japan's progress reveals many interesting facts. The Japanese are hardworking, well-disciplined and highly enlightened. They are tough and have a tradition of facing obstacles with courage. They are also highly skilled craftsmen. The society attaches importance to groups rather than to individuals, and consequently an individual will traditionally defend the interest of his employer, of his family and of any other group of which he is a member. This attitude has developed individual loyalty and group solidarity. Though the wages are low, the employees do not think that they are exploited because of the paternal interest of the employers and of the belief of the Japanese in the efficacy of the private sector. The need for the factory laws and trade unions was not felt seriously. Even now in spite of the factory laws and trade unions, the industrial relations are exemplary. The employers give frequent bonuses to employees, provide many social benefits and regard dismissal as unsocial.

There is a close relationship between Government and industry, and this has made the economy exceptionally responsive to man-made controls. Also, the industrial development policy encourages the Japanese to profit from and to improve upon the technological achievements of the West. The key sectors of Japanese industry are characterised by unrivalled efficiency and modernity. The country has put to use the most uptodate technical know-how of the world in a managerial set-

up which is essentially Japanese. Also, the rate of capital investment since 1955 has been higher than anywhere else in the world.

In Japan, the population is increasing very rapidly and the mid-year estimate of 1970 was 103.5 millions. The rapidly increasing population is a very serious problem of modern Japan. At the same time, the Government is of the view that an increasing population can also strengthen the national economy with proper manpower utilization. The Government is giving particular attention to the improvement of agriculture, reclamation of waste lands, development of manufactures and expansion of foreign trade with the object of solving the problem. Agriculture alone cannot support the increasing population which will require new lands four to five times greater than she has now. At present only 16 per cent of the total area is arable, and with care 5 million acres of new land may be reclaimed. A large proportion of farmers is engaged in subsidiary occupations which, today, account for 34 per cent of farm income. The combination of handicrafts and small-scale local industries with farming has been one of the most striking features of the Japanese economy. Very recently, however, a new class of farmers has been visible which takes the form of industrial employment combined with seasonal work on the farm. The problem of population which has become so serious in most Asian countries has been viewed in Japan as one which for its solution needs not only productive agriculture but also an expanding trade based on manufacturing industries. Meagre natural resources and the increasing population have not deterred the nation to become a great industrial country. In fact in respect of per capita income and rate of economic growth she compares favourably with any advanced country of the West.

The real secret of the country's tremendous success in the industrial field lies in the fact that the people have diligence, initiative and creative ability, who by their hard toil and technology-orientation have made Japan the leading shipbuilder, the third greatest producer of steel and second in automobiles in the world.

The Resources and Industries. The mountainous character of the surface, infertile soils, narrow coastal plains

and limited alluvial lowlands are the difficulties of the agricultural industry. Agriculture is possible only in about one sixth of the total area of the country and is practised on an intensive method. Where level land has not been available, the farmers use slopes of valleys, lowlands, artificial terraces or forest slopes. About 40 million people depend directly on farming. In recent years, certain changes have taken place in Japan in respect of farming community. Apart from the fact of land reform which now gives property right to farmers as well as incentive to improve their land, there is also the growing involvement of them in part-time employment in industry. Still another feature is the spread of mechanisation in agriculture notwithstanding small size of farms. Even then, the yield per hectare is very high because of unusual amounts of hand labour, mechanisation and fertilizer used. The size of a farm per family of six members is 0.97 hectare. The small-farming is a dominating factor in Japanese agriculture. The aim is, therefore, to get maximum yield by means of intensive management. The cultivated land of Japan can be divided into two main groups: irrigated land and unirrigated land. The most distinguishing feature of Japanese agriculture is the preponderance of rice crop. Limited land for cultivation, growing population and the government policy to encourage self-sufficiency in food account for the outstanding position of rice as a crop. Rice occupies about 56 per cent of the cropped area. The yield per hectare is 5800 kg, by far the largest in Asia but well below Australia (7,200 kg). This high degree of specialisation in the rice crop follows from the sub-tropical climate of Southern and Central Japan, abundant summer rainfall and easily irrigated alluvial lowlands. Other crops are wheat, barley, millets and pulses. Japan is also a producer of tea. The monsoon climate and the highlands are the favourable factors in tea production. The coastal districts of the Pacific side has the greatest concentration because of "more sunshine, less snowfall, a heavier rainfall, longer growing season and somewhat less severe winter temperatures".

Forests in Japan. About 65 per cent of the area of Japan is forested. Japan has three distinct forest areas: (*a*) Hokkaido for spruce, birch, fir and larch ; (*b*) Honshu for beech, chestnut, poplar, oak and ash ; and (*c*) southern forests of broad-leaved

evergreens. The economic value of forests is as a source of timber, charcoal, wood fuel, wood pulp and various foods such as nuts, fruit and bamboo shoots. Timber accounts for 54 per cent of the output of forest products, charcoal coming next with 24 per cent. Timber is obtained from coniferous and broad-leaf forests of pine, oak and maple. Japan is also rich in bamboos, cypress, camphor, lacquer (used for varnishes), the wax and mulberry trees. Economically, mulberry is a very important tree inasmuch as it supplies the natural food of the silk-worm, and the bark for use in the manufacture of paper, cordage and coarse dress materials. The bamboo is most useful for the framework of the houses, paper, walking-sticks, pipes, mats and many other things. Wood and wood products are highly important in the economy of Japan. Most of the buildings and utensils are made of wood. Wood is also used for the manufacture of paper and rayon, for fuel and for charcoal gas. Her domestic timber needs are so great that Japan has to import wood from Norway, Sweden and Canada.

Japan has only about 3 million cattle, 5 million pigs, 50,000 sheep and 270,000 horses. Although the country has plenty of rough land, the slopes are very steep for the grazing of cattle. Moreover, the sub-tropical climate of the country does not permit cultivation of fodder grasses; the grasses of the hill lands are harsh, coarse and innutritious for cattle.

Fishing. Fishing has extraordinary importance in the economy of the Japanese nation. Japan is the second greatest fishing nation and the natural catch amounts to about 15 per cent of the world's total. Till 1961, it was the leading country in the world in fish catches, but labour shortage and limited area for deep-sea fishing do not permit steady increase. Since 1962, Peru has taken the first place. The warm Japan current which flows along the eastern coast has an abundance of fish like sardines, mackerels and tuna. The waters of Kurlie current further north have herring, salmon and cod. Coastal fishing is the most important in Japan in which more than 90 per cent of fishermen are employed. The products of coastal fisheries are sardines, herring, mackerel, trout, cod, dog salmon, yellow trail, flat fish and shell fish. Japan exports more than a million dollar worth of marine products each year.

Japan has developed her agriculture and fisheries to a very high degree but she has not become self-sufficient in food supplies.

Mineral Resources. Japan has a great variety of mineral resources, but none is available in quantities sufficient for her requirements. The principal minerals are copper ore, manganese, chrome ore, petroleum, coal, iron ore, zinc, lead and sulphur. Yet the country has to import annually 99 p.c. for crude oil, 98 p.c. for iron ore, 80 p.c. for copper ore and 58 p.c. for coking coal. Coal is the most important mineral of Japan. It provides more than 60 per cent of the value of her mineral output. The coal-fields of Japan are scattered throughout the islands. Northern Kyushu and Hokkaido are the leading producers. Kyushu alone raises more than 60 per cent of the total output of Japan's coal. The Chikuho field of Kyushu is situated near the sea and is an area of dense population. Hokkaido supplies 17 per cent of the total output.

As most coal in Japan is bituminous and of low carbonising degree, Japan needs to import almost all the coking coal for iron and steel manufacture and high-grade anthracite coal for carbide. The coal-seams are thin, sloped steeply and have many shifts and folds. Coal-pits are usually springy and full of gas. Coal-fields are on so small a scale that even the largest coal-field in Japan (Isikari Coalfield) is no more than one-fortieth of the Saar Coalfields, and one-third of the Ruhr. Production is therefore costly, and it is difficult to mechanise the mining. The manufacturing industry consumes 44 p.c., energy 42 p.c. and transportation 13 p.c. of the total production of coal. In general, the consumption of coal by the energy section (electricity, gas, cokes and lignite) is inclined to increase, while that by manufacturing and transportation decreases.

Next to coal, gold is the most important mineral product in Japan. Mining operations are confined to northern Honshu and southern Kyushu. Gold ore is commonly found in association with copper and silver ores. Copper constitutes 13 per cent of the total mineral value of Japan. Copper is found in many places throughout the islands. More than 75 per cent of the total copper comes from the five mines of Asho, Besshi, Kosaka, Hitachi and Saganoseki. Japan ranks fourth in copper production, being surpassed by the U.S.A., Chile and Canada.

Japan raised about 804,000 tons of crude petroleum in 1970 against her annual requirements of 6 million tons. Such an utput is of no world significance, for Japan is outranked in l production by some 17 countries. The oil-fields are found western Honshu. Some oil-fields are also found in Hokkaido.

Japan is slowly switching from coal-based economy to an il-based economy in spite of the fact that coal is abundant nd oil is negligible. Falling price of crude oil in the inter- ational market and the lower tanker freightage, have helped apan to develop oil refinery. The oil refining capacity of apan is about 1.50 million barrels a day compared to Britain's .1 million barrels. This shifting to oil is a revolution which as taken in Japan's energy supply today. Japan is therefore howing interest in developing oil areas in Sumatra, Australia nd Algeria. Japan imports oil from Middle East (72 p.c.), ndonesia (16 p.c.), U.S.A. (3 p.c.) and New Guinea.

Sulphur is abundant in Japan. This arises from the volcanic ature of the island. This mineral is mainly used in the ferti- iser industry. The percentage of sulphur output against internal lemand is normally 156 and so leaves a large surplus for export.

The iron ore deposit of Japan is not considerable. The Kamaishi (Iwate Prefecture) and the Kuchan (Jokkaids) have in the past produced most of Japan's iron ore. The Gumma nine, Gumma Prefecture, is now the second leading producer after Kamaishi. The iron ore reserves of Japan are estimated at 170 million tons, which is about one per cent of the total oal reserves of Japan. The Kamaishi iron mine is the only place where the ore reserves are found at over ten million tons. Japan is poor in iron ore resources both in terms of total reserves and in the number of large deposits. Lead, silver, inc, tin, manganese and antimony are also mined.

Japan has many small and torrential rivers. The rugged urface of the islands, the swift-flowing streams and the heavy ainfall provide ideal conditions for developing hydro-electricity. lowever, short and narrow valleys do not permit large storage apacity and seriously hinder the development of hydro-electri- ity. Moreover, the rainfall is irregular. Most of the larger power sites are located on the eastern and southern slopes of he mountains although smaller plants are scattered through-

out the country. The plant sites are Kanto (24 p.c.), Kansa (20 p.c.), Tohoku (16 p.c.), Chubu (13 p.c.), and Kyushu (1 p.c.), The first hydro-electric plant in Japan was started i 1892 in Kyoto on a stream flowing from lake Biwa.

The hydro-electric power in Japan is mainly used fo industry, urban transportation and lighting the houses. 9 per cent of the residential households and industrial building are wired for electric purposes. Even in an industrially advance country like the U.S.A., only 75 per cent of such building are wired. Three-fourths of the requirements for power in the country come from the hydro-electric plants.

The Manufacturing Industries

The history of the development of manufacturing industries in Japan is a history of the governmental efforts and direct interest in this regard. Since 1868 when the feudalistic economy in Japan came to an end with the Meiji Restoration, it became the major concern of the government to develop machine industry, mining and commerce. "Students were sent abroad to learn the new western technology; foreign experts were invited to Japan; machinery and equipment were imported in increasing amounts; and state funds were applied to the founding of pilot factories, mines and technical schools." The government vigorously continued the policy of starting factories till 1880. Thereafter, the factories were sold to private owners who were encouraged to develop industries within the framework of national policy. Thus emerged private capitalism in Japan with adequate government controls. Between 1894 and 1913, Japan developed both light and heavy industries. This period was of special significance to Japan in view of her wars with China and Russia and her victories therein. The wars led to the development of heavy industries like metallurgical and engineering as well as to the expansion and improvement of her agriculture. The indemnity she received from China enabled her to expand her industrial activities further, and her victory in war with Russia in 1905 gave her the prestige and power to think and plan in terms of world markets. Textiles, pottery, paper and other light industries received impetus for foreign markets. During the World War I (1914-18), Japan

her increased her production and exports. Various indus- were expanded and power resources developed immediate- after the First World War. In 1963, she was at the top of production in the world, and she won first position among orting countries of cotton cloth in the world. Her exports rayon were also considerable. In 1935, her exports of steel ducts amounted to about ½ million tons. The Japanese nomy suffered tremendously because of the World War II the greatest problem of Japanese economy was to accom- her self-standing economy and to stimulate her exports.

Japan's industrial recovery started after 1948 when the powers withdrew restrictions in respect of industrial ipment. The outbreak of the Korean War and the govern- nt's effective controls over prices, credit and wages helped country to expand industrial production at a tremendous d, and by 1951 the production reached the pre-war level. 6, the production index stood at twice the pre-war level. nore recent years, the country has made startling progress. avy industrial production showed the highest increase ong all industries. Japan dominates the world markets for ps, and its steel industry is making a name for itself. There been also an expansion of production for durable consumer such as automobiles and electrical apparatus. The ntry has developed considerably the production of ceramics, nicals, rubber and petroleum products. The most signi- nt change today is the decline in the importance of cotton and food industries. All throughout, the central eco- nic planning of the government has played a key role in phenomenal growth of Japanese economy. The Japanese horities are very prompt in arresting inflationary develop-

There are at present about 10 million factory workers. e industrial production is concentrated in four regions: kyo-Yokohama, Osaka-Kobe, Nagoya and Northern Kyushu ch together account for 55 p.c. of the total industrial out- Japan ranks third in the world in industrial output after A. and U.S.S.R.

Japan's economy compared with a growth rate of around p.c. a year in the period between 1967 and 1970. The ex- of Japan in 1970 increased by 24 p.c. over 1969 Many U.S.A. industries, have been hard hit by the

Japanese goods, and there is a campaign in the U.S.A. controls on competitive imports from Japan. There is a suggestion that Japan should revalue its yen by 20 p.c.

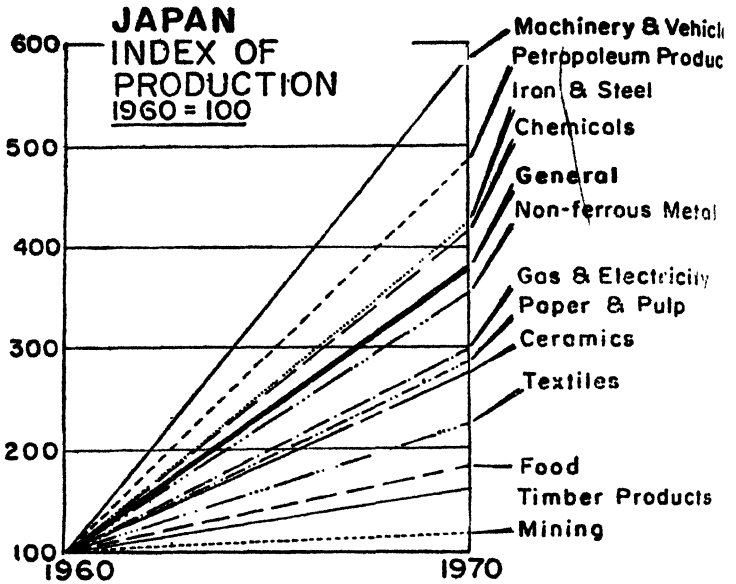


FIG. No. 72. Japan: Index of Production

The Textile Industry of Japan. The textile indu played a very dominant role till 1939, and was one of the l ing export industries. Today, in spite of the general ded of the industry, the country has the highest production chemical textiles. Japan has to import the largest portion her requirements of raw cotton, raw wool, rayon, pulp fr the different countries and therefore cannot take full adv tage of the supplies of raw material. The development of industry in consequence is favoured by geo-economic co derations in which Japan is comparatively fortunate. M over, the Japanese textile industry is favoured by the moisture and oceanic climate, so necessary for textile pro ing. Japan has also an abundant supply of industrious diligent labour. The post-war development of the textile dustry follows the rationalisation of production processes

improvement in technology. "Noteworthy is the structural nge of Japanese textile industry, from its pre-war character ured by rather intensive labour to its post-war character ured by rather intensive management."

Cotton manufacturing industry of Japan occupies an im- tant place in the economy of Japan. Osaka, Kobe, Nagoya Tokyo are the manufacturing centres. The largest number mills are confined to Osaka, known as Manchester of Japan.

Japanese cotton textile industry is entirely dependent on imports of raw cotton, which account for about 28 to 30 per t of the total imports. U.S.A. is the largest supplier of raw on to Japan. Since Japan has to import most of its raw erials for its textile industry from abroad to put its products he overseas markets, the future of the industry will depend international economic situations like the extent of self- iciency in underdeveloped countries, the size of population in kets and the competitive strength of the Japanese industry. e industry is, therefore, looking for markets not only in Asia, also in Europe, South America and Australia for its higher de printed and dyed cloth. All the same, the development of thetic fibres, the growth of cotton industry in China, India, ngkong and the increase in the competitive strength of her petitors have made the export position of cotton textiles st stagnant. Of late Japan has developed the synthetic industry considerably on the tradition of cotton industry.

The silk industry of Japan which was in a flourishing condi- before 1940, has been going through crisis. The industry omposed mainly of small enterprises. Since the ratio of fit to working capital in small manufacturing enterprises erally is 9·8 per cent, that of silk-reeling industry is only per cent, Japan has been importing raw silk now, instead of ing them for yarn.

Iron and Steel Industry. Because of their vital importance the industrial system and in many schemes of national nce, the Japanese Government is giving much assistance to l production. The modern Iron and Steel Industry in Japan an in 1901 when the Government opened the first plant at vata. Owing to the scanty supply of domestic resources, an has to import practically all the iron ore she requires. eit these disadvantages, Japan is the largest producer of

crude steel in Asia. Her crude steel production in 1968 67 million tons.

Japan has to rely upon India, Malaysia, the Philippi Australia and U.S.A. for her iron ore. The five countries s ply more than 76 p.c. of the total iron ore imports, whicl about 13 times as much as domestic production. The rise price of domestic coal in Japan is also a problem for the i industry. Today, the Japan's greatest export industry is i and steel.

The most important branch of metal industry is machine manufactures, which has been developed primarily

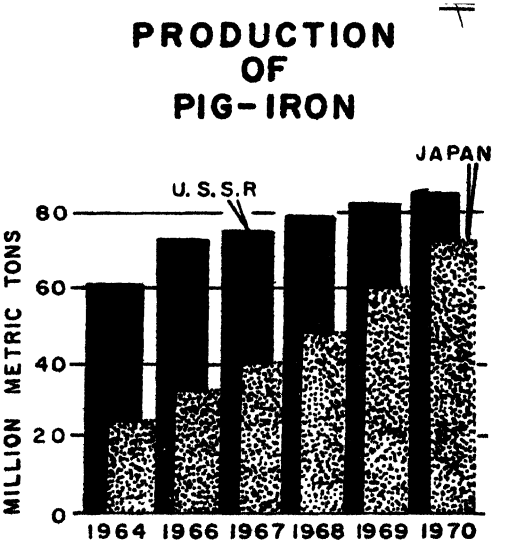


FIG. No. 73. Production of Pig-Iron

export. The other post-war industrial branches of iron and st industry are the steel vessels, automobiles and rolling Japan is the largest producer of ships in the world, and in production of commercial automobiles, she is surpassed only the U.S.A. The shipbuilding industry of Japan has acqui an outstanding competitive strength because of extens technological innovations.

The other important industries are chemicals, rub leather and hides, cement, sheet glass, paper and pulp, opti

aircraft and automobile industries. Rubber industry is of growing importance. Recently the Japanese have made much progress in chemicals. The pottery of Japan is beautiful and has a world-wide demand. Nearly one-third of pottery production is meant for export.

Japan has a large number of medium and small enterprises which play a very significant role in the country's economy. Out of a working population of 18 millions employed in all fields of industries in Japan, more than 14 millions constituting 81 per cent of the total number are employed in medium and small industries. The percentage of exports made by medium and small industries has been gradually increasing during the past few years. The products are furniture and fixtures, leather goods, electrical appliances, chemical goods, optical supplies, cameras, stoneware, glassware, toys watches and others. Most of the small industries obtain subcontracts from bigger industries for the supply of parts and various commodities. All the same the imbalance between the development of big industries and small enterprises has posed a serious problem inasmuch as the latter's survival demands more rigorous attention from the government.

One of the youngest industries is the manufacture of miniature transistorised receivers. More than 1 million units are exported, worth about £12 millions. Apart from direct sales abroad, the Japanese manufacturers have concluded a number of joint venture contracts with foreign firms for the manufacture of Japanese television sets abroad.

Foreign Trade of Japan[2]

Japan has increased the volume of her foreign trade to a large extent. Because of the paucity of industrial raw materials within the country, her dependence on supplies from abroad has been heavy. Similarly, her concern for overseas markets for her goods is great. Consequently, the prosperity of the country depends on her ability to import raw materials, export manufactured goods, and keep a favourable balance of trade.

[2] Japan is an "Export to Live" country. She cannot afford to import raw materials unless she exports her finished goods. Japanese firms are expanding their overseas business network in many countries through the Japan External Trade Organisation (Jetro).

Japanese trade with South East Asia and the Far East excluding China accounts for more than 30 p.c. of her trade in the world. Japan is also China's largest trading partner, and supplies to China steel, fertilisers and chemicals.

The exports from Japan consist of cotton fabrics, rayon fabrics, iron and steel, silk, chemicals, pottery, machinery and ships, radio receivers and optical instruments. Machinery and transport equipment account for one-fourth of the total export, followed by textile yarn and fabrics (20 p.c.).

Japan imports food and beverage, textile materials, metal ore, mineral fuels, vegetable products and others. The import of meat is a recent trend. New Zealand is the main supplier. The import of meat signifies a change in the consumers' taste from fish to meat.

Japan has a favourable balance of trade with India, which receives iron and steel, railway vehicles, electric machinery and industrial machinery. Japan receives from India iron ore, raw cotton, manganese ore, mica, leather and steel scrap. U.S.A., U.K., Canada, West Germany, Kuwait, Australia and India are the chief sellers to Japan.

Trends in Japan's Trade[3]

(P.c. share in the "free world")

	1953	1960	1968	1970
Japan ...	2·3	3·6	6·1	6·97
England ...	9·7	9·0	7·0	6·96
West Germany	5·9	10·1	11·7	12·3

Trade Centres and Ports

The most important trade-centres and cities of Japan are Tokyo, Osaka, Nagoya, Kobe, Yokohama and Kyoto. These cities are grouped very close to one another and none of them are far from the sea. Although there are 1,100 ports and harbours in Japan, only 11 ports are of international importance, each handling more than 10 million tons of cargo. These ports are Tokyo, Yokohama, Nagoya, Osaka, Kobe, Muroran, Kawasaki, Wakayama-Shimotsu, Kokura, Dokai and Takuyama-Kudamatsu.

[3] Source: Financial Times, London, July 5, 1971

Osaka is the business centre of Japan. It is often stigmatised as the City of Smoke, for there are many mills and factories in the city, whose smoke keeps the town under a cloak of grey all through the year. It is particularly important for cotton manufactures. It is located on the Osaka Bay at the eastern end of the Inland Sea and has connection by water with the rest of Japan and with foreign countries. Moreover, in the city itself facilities for water transport are excellent. It is sometimes called the Venice of Japan. But the hinterland is very poor in raw materials. Cotton spinning, printing and book binding, manufacture of machinery, iron and steel materials, paper goods and ship-building are the activities of the city. "Because of water transport within and without the city; because of its wide expanse of level land; because of the accessibility to raw materials, fuel and labour; and perhaps to a less degree because of a supply of capital originating from the commercial activities of the feudal period, Osaka has surpassed all other cities of Japan in industrial development."

Kobe, only 30 km from Osaka, is a port and possesses a deep natural harbour. It is known as a port of entry for important foodstuffs. Though it was declared a major port in 1951, it has become Japan's foremost international port by 1958 when it handled 38 p.c. and 20 p.c. of the country's total exports and imports respectively. The chief exports are steel, metal products, wood products, machinery, fertilizer and textile products. As the city is confined to a narrow coastal strip, there is limited room for industrial expansion. A high and continuous range of hills surrounds Kobe and the city is only 3 km long and 1½ km wide. Its activities are shipbuilding, match and rubber manufacture.

Tokyo, the capital, is situated on the eastern coast of Honshu. It is the third largest city in the world. Its two ports are Yokohama and Tokyo. *Yokohama* is one of the finest harbours of Japan. It is large, deep and well-protected. The chief exports are silk, cloth, metal products and medicine. It handles a cargo of about 30 million tons a year. Tokyo harbour is shallow and large vessels cannot enter there. Recently, however, because of modernisation and improvement, the port of Tokyo can accommodate 10,000 G/T class vessels. The principal industries of Tokyo are printing and book binding, the

manufacture of electrical apparatus, the manufacture of hard ware, and the manufacture of glass and rubber. Earthquakes frequently destroy the buildings and industries of the city.

Nagoya is situated on the south shore of Honshu between Osaka and Tokyo. Its harbour is artificial, and it is of not much importance as a port of call for the steamship lines connecting foreign countries. The great Mitsubishi aeroplane manufacturing factory is located in the city. The reeling of raw silk is the most important industry. China clay and porcelain works and weaving of cotton cloth are the other activities. Its geographical location has made it an important sea and land traffic centre of Central Japan. The chief exports are rolling stock, machinery, and procelain ware. *Kyoto* is an old industrial city of Japan. It is the cultural centre of the Japanese empire. *Wakayama* is situated 60 km south of *Osaka*. It is an important manufacturing city.

Korea

Korea is located on the eastern margins of China. It is a peninsula cut off from the mainland by a broad mountainous base.

North Korea is 121,000 sq. km in area with 8 million population while South Korea covers 98,000 sq. km with 25 million population.

Korea is a mountainous country, especially the northern and eastern parts. The west and south are somewhat plain where most of the agricultural land is found. In the mountainous forest-regions of the north and middle Korea, cultivation is carried on in the hill-sides. The eastern coastal region is narrow and is, therefore, not important for agriculture, which is mainly confined to the lowlands in the western parts. Crop-land occupies about 21 per cent of the total area. Rice, millet, tobacco, beans, cotton, hemp and other monsoon crops are cultivated. Rice is the most important crop and its cultivation covers about 40 per cent of the cropped area. In Northern Korea, barley and wheat are grown as summer crops. The Japanese encouraged the cultivation of cotton in Korea. The mineral wealth consists of gold, coal and iron. Gold mining is carried on mostly in South Korea. Iron ore is one of

the most important mineral resources of Korea. All important deposits are located in North Korea from the west part of Hwanghae-Do to the north-west of Pyongan Nam Do. The reserves of iron ore in North Korea are more than 100 million tons. Coal is mostly of soft and anthracite type, and the production is about 15 million tons a year of which about 6 million tons are raised in South Korea. Zinc, lead and mica are also found in fair quantities. South Korea has one of the world's largest deposits of tungsten.

Industries are highly developed in North Korea. Cotton textiles, hydro-electric power, chemical works, cement works, petroleum refinery are all in the Northern Section. North Korea is not only highly industrialised, but is self-sufficient in food also. South Korea is predominantly an agricultural country with rice, barley, wheat and tobacco as principal crops. Industrial plants are being developed for textiles, steel, cement, rayon, glass etc. in South Korea. The capital of North Korea is Pyongyang. The important manufacturing centres are Pusan (for silk), Kenjiho (for steel) and Inchon. There are 3,500 miles of railway in Korea. Cotton-textile industry is fairly well-developed in South Korea. *Seoul*, the capital of South Korea, is connected with Mukden by rail.

About 60 per cent of the foreign trade of North Korea is with U.S.S.R. China shares nearly 30 p.c. India has a small trade with North Korea.

PEOPLE'S REPUBLIC OF CHINA (Mainland)

China is the third largest country after the U.S.S.R. and Canada, and contains nearly half the inhabitants of all Asia. The total area of China is a little more than 9.7 million sq. km. The estimate of mid-year population in 1970 was 759.6 millions.

China is traditionally divided into North China, Central China and South China in terms of three river basins of the Hwang-Ho, Yangtze and Sikiang. The large size of China has not helped very much in regard to self-sufficiency, but it has proved to be a great military asset for defence in depth. More than 50 p.c. of the area consists of mountains, steep hills, and cold plateaux. Of the balance, two-thirds are arid. Barely

15 p.c. of the land is even and potentially usable for agriculture. And only 11 p.c. of the land is actually under cultivation where more than 78 per cent of the population work for a bare subsistence. There is much pressure of people on arable land. China's littoral location gives her the advantage of using two great ocean highways—one from Singapore and the other from North America. The entire seaborne trade of China today is, however, carried through the Singapore route. The eastern seaboard of China is the front door and extends up to a distance of 8000 miles. The northern coast is fringed by shoals, and navigation depends to a great extent on channels cut by rivers.

Transport. The bulk of China's freight and traffic is handled by railways. *There are about 32,000 km of railways in operation,* which are entirely inadequate to handle the traffic the economy of China demands. The principal railways are as follows: (*i*) Peking-Canton railway via Chengchow-Wuhan-Chuchow ; (*iii*) Tientsin-Shanghai railway via Pukev and Nanking ; (*iii*) Eastern Chinese railway from Manchauli through northern Manchuria via Harbin, to the Soviet frontier near Vladivostok ; (*iv*) South Manchuria railway—Chang-Chun-Shenyang (Mukden)-Dairen ; (*v*) Peking-Shenyang railway ; (*vi*) New great north-south trunk lines ; (*vii*) new great east-west trunk lines ; (*viii*) Chengtu-Chunking railway. There are numerous roads over which a vast internal trade is carried on. *The total highway mileage is about 200,000 km.* The important highways of commercial significance are (*i*) Kunming-Lashio (1000 km), and (*ii*) Szechewan-Sinkiang (4000 km). The first one is also known as Burma Road and is connected with Chungking and Saifu. The northern sector of Burma Road is connected with Assam by Ledo Road (re-named Stilwell Road) across North Burma. There is a new road between Kirkhizia and Lasha. Lashan-Sichang and Sichang-Hsiangun are two other roads.

The rivers of China are important both for irrigation and navigation. The chief rivers are the Yang-tse-kiang, Si-kiang, Hwang-ho and the Pei-ho. The Yang-tse-kiang provides an excellent waterway for more than 1600 km. from its mouth. The Yang-tse-kiang is the main channel of trade, industry and the only means of communication with Central China. It has

opened up an enormous tract of territory to foreign commerce. The Hwang-ho or Yellow River in North China is the second largest river of the country. Its disastrous floods have cost millions of lives and enormous wealth in China. From its source to the sea it is 4000 km long, and yet the river is not navigable. The course is either too swift and broken by rapids or becomes too shallow and filled with too many sandbars to allow the use of boats. Only in parts of Hunan and for 50 km above the mouth is the river navigable for steam launches. The Si-kiang in southern China rises in the highlands of Yunnan and flows eastward. The Si-kiang is navigable throughout its course.

These three river basins of China form distinct natural regions as regards relief, soil, climate and products.

Population. The distribution of population in China is very uneven. Density of population is very high in (*a*) the coastal plain from the Manchurian border in the north to the island of Hainan in the south ; (*b*) the plains watered by the Hwang-ho, Yang-tse-kiang and Si-kiang ; (*c*) the Wei-ho valley and the Red Basin of Szechewan. The alluvial soil, adequate rainfall and high summer temperature favour the cultivation of lands in all these regions. It must be noted that the very large population in China depends entirely on agriculture. The lower basins of the three great rivers have an average density of population of more than 300 per sq. km. The areas of low density of population are Tibet, Sinkiang and Mongolia which are desert-plateaux where the density is nowhere more than 12 people per square km. The Yunnan, although a plateau, is crossed by numerous fertile valleys and contains rich minerals. The region is therefore densely populated. The pressure of population in China is very great, being two per cent per annum. The average density of population is only 84 persons per square km. but the pressure on the cultivated land is as much as 1,000 persons per square km.

Resources of China : China is a vast country with rich mineral, agricultural and forest resources. Her soil is fertile and rivers are valuable for irrigation purposes. In spite of such vast resources and population, China had virtually no industry even fifty years ago. Certain geographical conditions

are responsible for her slow economic development. With the exception of the eastern part, the country is surrounded on all sides by mountains and deserts which render communication with the rest of the world difficult. This isolation was a factor which kept most of the people ill-informed of what was happening elsewhere. The products of the western side could not be conveniently brought to the eastern side as the means of transport were inadequate. Because of the physical features, the economic development and the concentration of population were in the north-south direction along the eastern margins.

Recently, however, China has become a respectable industrial power. Her per capita production is still very low.

Agriculture is the main industry of China. The monsoon climate and the fertility of the alluvial soil are the contributory factors. Agriculturally, China can be divided into two parts: Northern China for wheat, sorghum, millets, cotton, tobacco and soyabeans, and the Southern China for rice, tea and sugar-cane. Manchuria is known as the soyabeans empire of the world. The three basins of the Hwang-ho, Yang-tse-kiang and Si-kiang are very important for grain cultivation. Indeed, China is the world's largest grain-producing country and harvests about 175 million tons of grains a year. Millets and wheat are raised in Hopei, Shansi, Shantung and Hunan districts which are watered by the Hwang-ho. Rice is cultivated more or less throughout the country. The entire basin of the Yang-tse-kiang from Anhwei to the outer part of Szechewan grows rice. With an annual yield of about 80 million tons of rice, China accounts for more than one-third of the world's total rice output. The average yield of rice per hectare in China is 2500 kg. The wheat production is about 24 million tons. Cotton is grown extensively in the Yangtse and the Yellow River valleys. China ranks second after the U.S.A. in the production of cotton. The yield of cotton per acre is about 234 lbs. as against India's 77 lbs. Kiangsi and Fukien on the south-east coast are noted for tea. Tobacco is grown in most of the districts and there is a considerable export as well as a big home consumption. Silk, poppies, soyabeans and sugarcane are also found.

The agricultural development which was given a low priority in central planning of 1953 in favour of the develop-

ent of heavy industry so as to lay a foundation for an indus-al state, received again a greater attention by the end of 57. The Government now thinks that "industrial develop-ent requires simultaneous development of agriculture". The ricultural development for long did not depend on capital tensive measures such as reclamation, mechanisation or ex-nsive use of chemical fertilisers, but on the improvement of nit area yields and on the extension of sown area by means irrigation generally on a small scale. However, the Govern-ent is adopting methods to increase production of agricultu-l commodities, particularly foodgrains, as China is deficient them. Land was nationalised in 1949. The Government as been taking effective measures for the prevention of floods, ind-storm and the conservation of water and soil. The total ain production of China is about 200 million tons. China still unable to meet her domestic requirements of grains in ew of the increasing rate in the growth of population. nother problem is to feed the industrial workers of the north hich is the main industrial area of China. Since the northern egion is also the wheat-eating region, most of the imported heat is sent there. At the same time, the other areas also equire wheat because rice alone cannot meet the demand. ll efforts for agricultural expansion do not indicate that the ountry has become self-sufficient in food because of natural lisaster and lack of equipment. China has to buy substantial uantities of food every year from Australia, Canada, France, West Germany and Argentina, of which Australia and Canada upply more than 40 per cent each.

Husbandry supplies furs, hides and other animal products. Horses and mules are used as pack animals in the drier north. Cattle are reared throughout the country, while sheep are numerous in the north and the west. Pigs are domesticated in Szechewan in the west, Anhwei, Shuntung and Hupei in the north-east and Kwantung in the south-east.

China's mineral potentialities are extensive and varied. he most important region for minerals lies between Szechewan and Yunnan where almost every mineral is found. In regard to coal reserves, China stands fourth in the world, ranking next to the U.S.A., U.S.S.R. and Canada. Her coal reserves total pproximately 444,511 million tons. The coal and lignite pro-

duction in China proper is supposed to be about 300 to 400 million tons. China coal is mainly high grade anthracite and bituminous. The total amount of coking coal available in China has never been estimated. The principal coal mines are as follows: (*a*) North-East China—Hokang, Fushun, Mishan, Penchiku and Peipao ; (*b*) North China—Kailan, Tatung, Chungfu ; (*c*) Central and South China—Hwatung, Changhsing, West Kiangsi, Hsian-kiang, Hsianyung.

In North-East China, Fushun coal is one of the best steam and bunker coals in the Far East, although its heating value is not considered high. Penchiku coal is famous as one of the best coking coals in China. The field is located east of Mukden covering an area of 3,500 hectares. North China has the largest coal reserves of highest quality. This is the region where most of the Chinese anthracite comes from and where the highest heating value of China's bituminous coal occurs. North-Western China is less important so far as coal is concerned. In Southern China, Szechewan reserves rank first in quantity. More than 1,000 million tons of lignite are found in the province of Yunnan alone. The principal coal mines of China bear little relation to the location of the largest deposits, but are located along the railways or near water transportation.

China dominates the world market in tungsten which is an important alloy in the manufacture of steel and for the filaments of electric lights. China supplies about 20,000 metric tons of tungsten a year. The ores are found in Kiangsi, Hunan and Kwantung. West Germany is the leading buyer of Chinese tungsten. *In antimony, China has almost a world monopoly.* Antimony is useful as a hardening agent for lead and enters into the composition of type metal and anti-friction metal. Hunan is the leading producer of antimony. Small quantities of this ore are also found in Kwantung, Yunnan, Kiangsi and Kweichow. The annual output of antimony is 17,000 metric tons. *Tin is also a valuable metal in China.* South-western China borders on the great tin zone of the world which extends from Burma through the Malayan States to Indonesia. China's tin mostly comes from the Kochiu district in southern Yunnan, eastern Kiangsi and Hunan. The bulk of the ore is shipped to Hongkong and Haiphong for refining. Recent estimates furnished by the Government of People's China put the total

on ore reserves at about 4,200 million tons including 103 illion tons of Hainan high grade iron ore deposits. China, herefore, has both the iron and coal necessary for the steel ndustry. The Chinese iron ore deposits, however, occur in idely spaced areas making cost of transportation high. The mportant iron ore mines are in the provinces of Chahar, Shansi, Kiangsu, Szechewan, Hupei, Anhwei, Yunnan, Fukien and Liaoning. The other minerals found in China are copper, ead and zinc, manganese, mercury and bismuth. Copper ores re found in Yunnan, Kansu, Sansi and Chekiang. The argest plants for working lead and zinc are in Honan and Yunnan. China raises about 5 p.c. of the world's total nanganese. China's production of mercury comes from Hunan and Kweichow. Oil is being extracted on the Upper gtse, in Shensi and the Yemen region of Kansu provinces. put of crude petroleum is claimed to be at 12 million tons. kiang in West China is likely to be an important producer the future.

The development of mining is greatly hampered by the dvantageous location of the chief mineral areas. As they mostly situated in the interior, the distance is considerable m the ports, and transport facilities are very poor. Iron ore not generally found near the coal-fields, a factor which is ponsible for the slow development of the metal industry.

The manufactures of China are being developed steadily, l the heavy industry is the corner-stone of central planning. vo distinct periods in the economic development of New ina are noticeable—the period of economic rehabilitation up 1952 and the period of economic construction after 1953. The rst Five Year Plan was started in 1953 to construct the nentary basis for Socialist industrialisation of the country. he Second Five Year Plan in 1958 aimed at constructing the ong basis for the Socialist industrialisation of the country, doubling the production of every branch of industry each

By 1961, the second plan was given up in favour of nual plans for recovery of agriculture and consolidation of dustries. In 1966, a Third Five Year Plan was again started ith emphasis on agriculture. In 1970 a policy of establishing all scale local industries was introduced.

Silk, woollen goods, cigarettes, vegetable oil, porcelain an lacquered wares are the other products of the manufacturir industries. Recently the iron and steel industry has engage the attention of Government. The biggest steel works a located at Anshan, Wuhan, Paotow, Shanghai, Pekin Chengchow, Tientsin, Taiyuan, Chungking and Penhsih Anshan in Manchuria is the principal metallurgical cent which has a probable capacity of 6 million ingot tons of stee Wuhan in Hupei started steel production in 1957 with Sovi design, equipment and technical personnel. Though it has capacity of 3 million tons of steel, the actual production about 750,000 tons. Paotow which began production in 195 has yet to complete a few more blast furnaces and open hearth Shanghai produces between 1.5 and 2 million tons. largest plant in the Peking area is in Shih-Ching-Shah wit about 500,000 tons a year. At Shanghai a ship-building ya has been opened. Tanning and cement works are centred i Kiangsu and Shantung.

Foreign Trade of China

The foreign trade of China is handled by the governme through a National Import and Export Corporation and other commodity corporations. Silk, rice, bean products, cott and tea comprise the bulk of China's contribution to worl trade. The other exports are tin, sugar, hides, pottery an bamboo wares. The principal imports are raw cotton, han ware, machinery, ship-building materials, rubber, arms ammunition and matches. The direction of the foreign tra has undergone several changes in recent years. Before Second World War, China's trade was mostly with Europ countries. After the war and till 1960, about 50% of the trad was with the Soviet Union, 20 p.c. with other Communis countries and 30% with non-Communist countries. To China has about 30% with Communist countries and 70 p with non-Communist countries.

China imports wheat and wheat flour as part of a polic to maximise export of rice and to obtain a net gain in foreig exchange. Her performance in the export of textile goods

he South-East Asia has affected Japan already. Her increased mport of raw cotton suggests a determination in regard to extile export. Another trend in recent years is the decline n the Sino-Soviet trade. China imports rubber from ndonesia, and now that Singapore is not in the Federation of Malaysia, China has diverted her source from Indonesia to Singapore for rubber.

Ports and Trade Centres

The important ports of China are Tientsin, Shanghai, Hangchow, Canton, Nanking, Hankow and Fuchow.

Shanghai is the most important port in China, handling as it does in normal times over 50 per cent of China's foreign ade. Shanghai is situated on a tidal creek near the Yang-e-kiang. Its manufacturing industries are cotton and silk. It s the principal port of modern China, and is the natural out-et of the Yang-tse-kiang. Its situation approximately midway the China Coast makes it at once the most natural distri-uting centre for extensive trade with coastal ports: but of far ater importance is the fact that Shanghai commands the position for commerce and the very outlet of the whole ngtse river system. The harbour is not very deep and, there-e, big steamers have to anchor at some distance from the ore. *Hankow* is situated at the confluence of the Yang-tse- and the Han rivers. It is an important river port and nufactures cotton, silk and steel. *Tientsin* is the port for iping and is the main outlet for the produce of northern ina. *Nanking* manufactures silk and cotton. The other ade centres are Mukden, Darien and Newchwang.

Hongkong is an island port near the mouth of the Si-kiang southern China. It has an area of 398 sq. miles with 4 illion population (1971). *Victoria* is the town of the island. is the main outlet for the produce of Southern China. The dustrial development of Hongkong in respect of electronics been considerable because overseas manufacturers find ongkong an excellent Asian base. Hongkong is a free port, nd carries on a large entrepot trade with Australia, India nd the United Kingdom.

Taiwan known previously as Formosa is located in the Eastern Pacific Ocean, being separated from the mainland of China by the Straits of Formosa—a distance of 110 miles. The island has a very strategic location for approaching Japan from the south. Its length is about 400 km with an average width of nearly 120 km. It has an area of about 35,000 sq. km. The total population of the Island is 14 millions. The population is mostly confined to the plains of the northern and western Formosa.

About 75 per cent of land is forested. Forests of the region yield various products, of which camphor is the most important. The climate and soil favour agriculture, and the principal crops are rice, tea, sugar-cane and camphor. Mineral wealth includes coal and petroleum, and their production is making steady progress. In 1957, the Island refined 867,000 tons of crude oil. Taiwan's industrial future will depend the extent to which foreign capital is attracted and investment at home is promoted. *Keeling* is the main trade centre and port.

The principal exports of Taiwan are sugar, fruits, cotton fabrics, rice, steel bars, bamboo shoots and menthol crystal Japan takes about one-third of the export. The U.S.A. is close second.

The Philippines

The total area of the country is (299,400 sq. km) with population of a little above 38 millions for 180 persons square mile of land area. Forests cover 60 p.c. of the area and supply timber, gums, resins, barks and bamboo. Area of land under cultivation is about 14 p.c. of the total land area. About 4 million people depend directly on agriculture. The chief crops are rice sugar-cane, maize, cocoanuts, abaca[4] and tobacco

[4] Abaca, a species of plantain which yields a valuable fibre, the called *Manila hemp* of commerce. It is like the banana in habit of The leaf stalks are split into long strips, beaten with clubs, hu washed and dried.

ice is the staple cereal food of the Filippinos. Nearly 60 er cent of the crop acreage is devoted to rice and maize. It ises about 5 million tons of rice a year. Compared to other ctors in the country, agriculture maintains a steady increase i its contribution to national output.

Sugar is raised for export. In normal times, sugar accounts ir well over a third of the total value of all Philippines' ports. The annual production of sugar is a little above 1.5 illion tons while the home consumption does not exceed 15,000 tons, leaving a considerable surplus for export.

Of late, mining has become very important. Gold production has made great progress during the last ten years and found in northern and southern Luzon, Mindanao and Masbate. The principal base metals are iron ore, chrome, anganese and copper. Coal occurs in almost all the larger lands of the Philippine Archipelago, but the deposits are not lways extensive enough for commercial exploitation. Only in few localities have coal deposits been found in sufficient bundance to warrant development. The total reserves of oal are estimated at only 41 million tons. The iron ores of ie Philippines are located in Albay, Cebu, Samar and Davao. he high grade iron ore reserves are estimated at 18 million ietric tons. The iron ore production in 1969 was 1.4 million ons. Practically all iron ore produced in the country is xported to Japan. The other minerals are manganese, nickel nd lead. Recently uranium ore has been discovered in the ountry.

There is little industrial development in the Philippines. Manufactured goods consist of cigars, cordage, pearl buttons, mbroidery, canned pineapple and hats most of which are arried on in homes.

The most important items of export from the country are ugar, copra, timber, copper ore, iron ore, plywood, lumber, ineapples and tobacco. The imports into the Philippines are otton goods, iron and steel goods, vehicles, silk goods, paper, ood, cigarettes, petroleum, chemicals and pharmaceutical products, explosives, fertilizers and machines of transport. Cotton ds, iron and steel and food products form the bulk of

imports. On account of the fact that agricultural products are raised mostly for export, the country imports foodstuffs—chiefly meat, fish, wheat and dairy, representing normally 10 p.c. of all imports. The direction of trade is mostly with the U.S.A. (export 75 per cent and import 62 per cent) and Japan.

Thailand

The area of the country is just under 514,000 sq. km which is rather less than that of Burma. The population consists of about 36 millions. These are mostly confined to the alluvial plains and river valleys, where the cultivation of rice is possible. The alluvial plains of the Menam and Mekong rivers in middle Thailand are the most populated parts of the country. North Thailand has only a scanty population. The central plain which is drained by the Menam is the most productive part of the country.

About 60 per cent of the land is covered by forests. In the north, mixed deciduous forests with teak predominate. In all other parts of the country, tropical evergreen forests are found. Most of the teak timber in northern Thailand is floated down to Bangkok for distribution and utilization. The cultivated area occupies about 10 per cent of the total land area. 83 p.c. of the population are engaged in agriculture. The chief produce is rice. Other products are cocoanut, tobacco, pepper, cotton and rubber. As rice accounts for 94 per cent of the cropped area, the question of irrigation is very important. Only limited sections of Thailand receive adequate fall (70″) for rice cultivation. Canals and ditches have be constructed to direct flood-water to fields. The minerals in Thailand are varied—but little developed except tin-mining. The country has deposits of wolfram, antimony, coal, copper, gold, iron, manganese, molybdenum, rubies, silver, zinc and zircon. By far the most important are tin and wolfram. Iron deposits are the most widespread of all mineral deposits in Thailand, but only a few workable deposits have been discovered. Tin has been worked in Thailand for centuries. It estimated that reserves of tin in Thailand will be no less than one million tons and can be worked for another century.

The country possesses a few industries of importance like ment and sugar. The Government has lately set up a paper ctory, and a factory for the weaving of cotton cloth. The National Economic Development Board set up in 1959 has aken the task of planning for industrial development. There s a large foreign capital investment mainly from Japan, U.S.A., West Germany, U.K. and Denmark.

Japan, Malaysia, Singapore and U.S.A. together account or more than 50 p.c. of Thailand's exports. The principal xports are rice, tin, rubber, and teak. The imports are motor vehicles, petroleum, textiles, metal manufactures, machinery and food-stuffs. About 45 p.c. of the imports come from U.S.A. The other sellers are U.K., Japan and West Germany. Among Indian exports to Thailand gunny bags are by far the most important followed by cotton yarn and textile manufactures.

Bangkok on the river Menam is the capital and only port Thailand. Many canals run through Bangkok and, therefore, it is known as "the Venice of the East".

Malaysia

It consists of West Malaysia, Sabah and Sarawak. The maximum annual rainfall is 198 inches. In 1970, the population was estimated at 10.8 million. There are certain remarkable features in the distribution and composition of population. The density in the West Malaysia is 167 per square mile and in Sarawak, it is 18. The eastern part of the peninsula s very scantily populated as the area is forest-covered. Of the otal population Malayans account for 50 per cent, Chinese 38 per cent, and Indians 11 per cent. Tin-mining and business are in the hands of the Chinese, while rubber tapping is done by the Indians. Malayans follow agriculture.

The mineral wealth lies mainly in tin, of which Malaysia s the world's greatest individual producer, her output sometimes approaching 40 per cent of the world's production. The export duty on tin is always a major source of Malayan

revenue. Tin is found in innumerable places in the Peninsula from its northern to its southern limits, from parts in the eas to parts in the west coast, and between these two extreme boun daries, there are about 700 mines. Generally speaking, the tin deposits can be divided into two zones—the western tin-bel and the eastern tin-belt. The western belt includes Kedah Perak, Selangor, Malacca, Johore, Pahang and Kelantan. Th eastern tin-belt includes Trengganu. The possibilities of in creasing tin production in the near future will depend on a number of factors Agriculture, particularly for large paddy projects, has conflicting claims over certain areas of potentia mining land, and the world shortage of rice gives those claim great importance. Secondly, the increasing demand for aluminium in place of tin in the world markets may affect t prospects of the industry. Thirdly, the tin contents of the ore are becoming poorer, and unless new and rich tin deposits a found, the position may soon become unenviable. Malaysia's reserve of tin is the world's largest and is estimated at 1.5 million tons of contained tin in leased areas only. Tin i Malaysia's second biggest source of export earnings. Becau of the recession in industrial activity in the main consumin countries, the demand for tin recently has gone down. Th existence of the International Tin Agreement and the coopera tions of the International Monetary Fund have helped th producers of tin to face the price crisis. Bauxite, wolfram, i and manganese ores and phosphate of lime, kaolin, coal, g and arsenical ores are also found in varying quantiti Tungsten ore comes mainly from a large deposit of Scheeli at Kramat Pulai in Perak. Wolfram ore is mined in Kedah a Trengganu. Coal deposits are found in Selangor. In recen years, iron has come to occupy a significant secondar position.

The major crops are rubber, cocoanut, rice, oil palms an pineapples while coffee, tea, tobacco, banana and tapioca ar less important. About 65 per cent of the total area is unde rubber plantation, grown mostly in the states of Malaya. late, the adoption of improved agricultural practices and use of yield stimulants or the trees have contributed towards a increased yield per hectare. Rubber is the life-line of Malaysi

as it is the nation's single most important crop for export, gives employment to more than 200,000 workers and 100,000 small holders and provides about 30 p.c. of total export earnings. Rice covers 14 per cent of the crop area and is grown exclusively for home consumption. Rice production is, however, insufficient for the country's needs and can meet only half the requirements. Its annual production of rice is half a million tons. One of the problems of Malaysian agriculture is the landlessness of cultivators. Between 50 and 70 p.c. of the cultivators do not own their own paddy land but work for the landlords. There is also fragmentation of land because of the law of inheritance, leading to indebtedness.

The principal items of export are rubber, tin, copra, tinned pineapples, iron ore, and timber. Malaysia supplies about 50 p.c. of the world's requirement of natural rubber. Tin and rubber constitute 60 per cent of exports. It imports rice, sugar, milk, tobacco, iron and steel, vehicles, machinery and petroleum. Sixty per cent of rice and almost all milk required are imported. India supplies cotton goods, jute goods, sugar, tobacco, spices, fruits and vegetables etc. India imports palm oil, tin, crude rubber, gums and resins, dyeing and tanning substances.

Malaysia is not an industrial country. Apart from tin smelting, local industry is small and confined to pineapple canning, brewing, the manufacture of rubber articles, soap, matches, cigars, biscuits and ice. The foreign firms are capital-intensive and do not offer much scope for increasing employment. The poverty of people is another factor in hindering the development of local market.

The future economy of the country depends on two factors: first, a continued world demand for her rubber ; secondly, success in gradually establishing an economic structure which does not depend heavily upon the production of commodities liable to sharp fluctuation in price.

Kuala Lumpur is the capital of the Federation. The other towns are Penang, Ipoh, Malacca, Taiping and Johore Bahru.

Singapore consists of Singapore Island with some adjacent islets, and Christmas Island and Cocos Keeling Islands in the

Indian Ocean. Singapore Island is situated at the extrem southern point of the Malaya Peninsula with 582 sq. km of area The climate is typically tropical. Singapore with a populatio of 2·1 millions is the fourth biggest port in the world. It has natural harbour and has also planned an extensive container shi terminal. It has a great entrepot trade. Rubber, tin and copr are collected from Malayasia and exported to the U.S.A., th U.K. and Japan. It also exports pineapples, spices and iron-ore More than 20 p.c. of Singapore's foreign trade is with Malaysia.

DEMOCRATIC REPUBLIC OF VIET-NAM, REPUBLIC OF VIET-NAM, CAMBODIA AND LAOS

The four states, *i.e.*, the North Viet-Nam, South Viet-Nam Cambodia and Laos, have a population of about 50 millions The population problem is one of mal-distribution; the low lands are greatly agglomerated while the upland and mountain ous regions are very thinly settled. About 78 per cent of the population occupies 13 per cent of the total area. But all alluvial lowlands are not equally populated and developed. The alluvial lowlands of the Red River have densities while the alluvial plains of Cambodia have low densities and production. Agriculture plays an overwhelming part in the economy of the four States. The important crops are rice, rubber, cocoanuts, and maize.

The country is rich in minerals but the development of mining is slow and meagre. Coal, tin, zinc, wolfram, lead, silver, antimony, chrome, iron, phosphates, tungsten, manganese, bauxite, graphite, copper and rock salt are the principal deposits.

The manufactured articles are alcohol from rice, sugar, cement, cigarettes, soap and matches.

The principal exports are rice, rubber, maize, coal, fish, tin ore, cement, sugar, pepper, beer, cigarettes, chromium, manganese and sodium chloride. The imports are ginned cotton, cotton tissues, iron and steel, paper and paper manufactures, silk

issues, machines and machinery, motor cars and parts, coal, potatoes, etc.

THE REPUBLIC OF INDONESIA

The Republic of Indonesia contains over 2,000 islands of which the largest are Java, Sumatra, Borneo and Celebes.

It has an area of 1·9 m. sq. km with 121 million population (1970) and extends more than 5000 km from east to west.

Although most of the islands are mountainous, the valleys and the plains are fertile and well-watered. There are two types of farming in Indonesia: *Small holding agriculture* and *estate agriculture. Small-holding agriculture* is in the hands of the Indonesians, and the peasants are concerned with the production of food crops for domestic consumption. Rice is the leading crop of the people and occupies 45 per cent of the crop areas, with maize 23 p.c., root crops 14 p.c., pulses 9 p.c. and tobacco 2 p.c. *Estate agriculture* was developed by the Dutch. The principal crops are rubber, sugarcane, coffee, tea, oil palms, cassava, cinchona and tobacco. The estate agriculture is characterised by scientific and extensive use of land with intensive use of capital and labour. There has been considerable decline of production in estate agriculture because of mismanagement.

The importance of Indonesia as a producer country can be best judged from the fact that she is the world's largest supplier of cinchona bark, pepper and palm oil products and a large supplier of rubber, sisal and cocoanut products. The Republic is self-sufficient in food supply, and famines are almost unknown.

The mineral resources are varied. Oil-fields in Borneo, Celebes, Sarawak and Java have recently become very important and these supplied 45 million tons of crude petroleum in 1970. Palembang in Sumatra and Tarakan in north-east Borneo are the two important oil centres. Coal production is insignificant with an annual production of about 400,000 tons. Indonesia supplies 18 per cent of the world's tin. Nearly $\frac{2}{3}$ of the output is from the island of Banka and $\frac{1}{3}$ from Belliton. The other minerals are bauxite, coal and manganese.

Rubber normally accounts for 40 p.c. of the total export value, oil for 23 p.c., tin for 6 p.c., tea for 2 p.c. and sugar for 2 p.c.

The share of Netherlands which was the biggest in the foreign trade of Indonesia till 1951 has declined considerably. At the same time, its trade relation with U.S.A., Japan and West Germany has gone up by four times in the case of each country. The country has always maintained a favourable balance of trade.

Java is by far the most developed island in Indonesia and it boasts of a highly organised sugar industry in the East. The important trade centres are Semarang, Surabaya, Palembang and Djambi. *Djakarta* is the capital and possesses a magnificent harbour. The other important towns are Bandung and Bogor.

THE NEAR AND THE MIDDLE EAST

Turkey, Syria, Iraq, Saudi Arabia, Afghanistan, Iran, Lebanon, Kuwait, Bahrein, Qatr and Israel are popularly known as the *land of the five seas.* The part of Western Asia is washed by the Caspian Sea, the Black Sea, the Red Sea, the Mediterranean Sea and the Persian Gulf. Most of the Middle East countries are poor in natural resources except petroleum. In fact, petroleum is the basis of the Middle East economy inasmuch as the revenue from it permits the implementation of several development programmes. In 1970, the region produced more than 650 million tons of oil out of the world's total of 2,334 million tons. These countries are importers of consumer goods from the West and the East. For limited industrial development, they import capital goods for agricultural hydro-electric and irrigation development.

Syria. It covers approximately 71,772 square km of land with about 6.2 million population. More than one-third of the total area is either desert or steppe. Agriculture is the chief source of wealth. Sixty per cent of the arable land is devoted to the cultivation of cereals. Fruits, grapes, wheat, cotton and barley are grown in the western part of the country where the

limate is Mediterranean. The central and eastern parts pro-ide pasturage for livestock. There is a good trans-desert road ›etween Damascus and Baghdad, and an excellent network of oads connects Beirut with Damascus and Tripoli as well as vith numerous hill stations of Lebanon. The region is making teady progress in industrial development. A number of woollen and cotton textile mills are now in existence. Notable progress has also been made in cement, soap, silk, matches, cigarettes and canned fruit industries. The country is not rich in minerals, but there are petroleum fields in various places and iron ore, lead, copper and other minerals are known to exist. The exploitation of its oil is entirely under national control. The Russians have helped with drilling, the Czechs built the refinery, the British the pipeline. The industries are cement, tobacco, sugar, brassware and tanning. A state trading company has been set up to handle the nationalised exports and imports. Raw cotton is the major export commodity, and accounts for 40 p.c. of the total exports. *Tripoli, Beirut* and *Saida* are the principal ports. *Aleppo* and *Damascus* are historically important.

Iran comprises an area of more than 1.6 million sq. km with a population of nearly 28.5 millions. As the vast portion of the country is desert, the average density of population is only 20 persons per square km. Iran offers a road of approach to the open sea from the point of view of Russia. Iran possesses every type of climate from the extremes of tropical heat near the shores of the Persian Gulf to extreme cold in the high regions of the Elburz mountains. The relief and availability of water in Iran control the distribution of population. The Caspian provinces of Gilan and Mazandeam have the highest density of population with 100 persons per square mile.

Iran contains petroleum, coal, iron, copper, lead, zinc, manganese and rock salt. With the exception of petroleum, minerals have not been very much developed. The petroleum fields are in the south-western part of the country. The oil-fields are connected by a double pipe-line, 145 miles long, running through Dar-I-Khazina and Ahwaz to refineries at Abadan. In 1970, the crude oil production was 190 million tons. Iran is the fourth largest petroleum-producing country in the world.

About one-twelfth of the land is under cultivation and the principal crops are wheat, barley, rice and cotton. Sugarcane and tobacco are also raised. The Government has plans for irrigation development and it is expected that the country will be able to produce more.

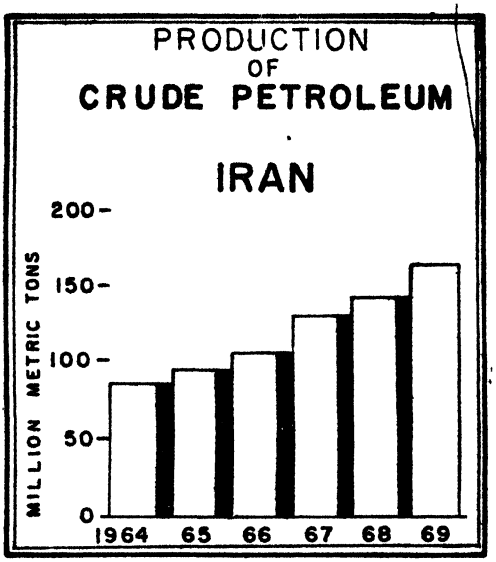


FIG. NO. 74. Production of Crude Petroleum

Iran has developed various industries on modern lines. Large sugar factories are located in Karaj, Kahrizak, and Shahabad. Cotton mills are in Sahi, Tabriz, Teheran and Yezd; woollen mills are at Tabriz and Isphahan; and silk factories are at Chalus. The other industries are cigarette-making, soap-making fruit-canning, glass-making and tanneries. Iran is making a massive industrial push to lay the foundation for heavy industry base through foreign loans, international partnership agreements and barter arrangements with East European countries. The chief source for industrial plan lies in oil income which is rising at a rate of more than 10 p.c. a year. An agreement has been reached with the Soviet Union to construct a steel mill and a trans-Iranian gas pipeline from the

uthern fields to the Iran-Soviet border. An aluminium plant scheduled to be set up at Bandar Mashur. From February, 968, the Iran Government has started the Fourth Development Plan to cover every sphere of her economy over the next ve years and to raise the standard of living of the Iranian lasses. The annual rate of growth has been fixed at 9 p.c. The top priority goes to industrial development and the Government is concentrating in heavy industry, petro-chemicals nd other industrial infrastructure projects, leaving the consumer market for the private sector.

Want of adequate means of communication is a great handiap. *The only important rail-road is the one which connects he Caspian Sea coast with the Persian Gulf area. The line lasses through Teheran and plays an important role for the ranshipment of goods to the U.S.S.R.* Several branch lines re being constructed to connect Tabriz with Kazrin and Qum vith Yezd. There is also a scheme for connecting Teheran vith Zahidan (on Pakistan border) via Meshed. *Roads* are ery important in Iran. There are at present 15,000 miles of notorable roads on which much of the internal trade depends. The Government has its own *air services.* Excellent aerodromes xist in Teheran, Tabriz, Meshed and Isphahan. Air services lave been established between Europe and Teheran.

The principal exports are petroleum, rugs, dried fruits, raw cotton, livestock, wool, rice and gum. Petroleum and its products account for about 80 p.c. of the value of exports. The mports are cotton cloth, sugar, tea and machinery. The important buyers are U.K., West Germany, U.S.S.R. and U.S.A., and the sellers U.S.A. and West Germany. India takes from Iran rugs, silk, gum, dried fruits and petrol, and sends tea, sugar and cloth.

Teheran lies almost at the foot of the Elburz mountains. Though situated in the midst of an arid steppe, Teheran has been the political centre of the country since 1788. The city is famous for artistic fabrics like carpets and rugs, and also for wine, etc. *Shiraz* is situated at an elevation of 4,500 feet above sea level and 120 miles east of the Persian Gulf. It is famous for its excellent wine, rose-water and attar of roses. *Tabriz* lies near the above sea level. It is the principal trade

centre of the kingdom. The neighbourhood is very fertile, producing large quantities of grapes and fruits. Both *Bandar Abbas* and *Bushire* are noteworthy ports on the Persian Gulf. The climatic conditions are excellent for aviation as there are no fogs and high winds. These two ports do considerable trade with India and the neighbouring State of Pakistan.

Israel : *The State of Israel* includes the entire coast from Galilee to the point of Gaza. It has the Mediterranean Sea on the West, Lebanon and Syria on the North, Jordan on the East and Egyptian Sinai on the South. It contains an area of 20,700 sq. km with 2·9 million population. About 90 per cent of the population are Jews. The population of the State is made up, to a considerable extent, of immigrants from Europe, particularly from Russia, Germany, Austria and Spain. They have already transformed the economic structure of the State by developing the natural resources, raising the productivity of agriculture and industry and introducing progressive means of production and distribution. The industrial experiments are being undertaken not by the State as in the other Middle East countries, but by private initiative and enterprise.

Although the State is poor in coal, it has large deposits of other minerals like potash and bromine which are found in the Dead Sea. Oil production which was first started in 1955 at Heletz in the Negeb, is on the increase, and in 1970, the output was 85,000 metric tons. Copper is found near Eilat.

Important agricultural products are citrus fruits, vegetables, potatoes and grains. The agricultural areas are along the coastal plain with the Emek as the main centre. The backbone of the agricultural economy is the irrigated portion of the country. Citrus occupies a significant position in the list of export crops. Agriculture is being developed by underground waters, by bringing water from the Yarkan river to the Negeb and by storing rain water. Banana plantations and fish breeding are carried on in the sub-tropical Beisan and Jordan. The Hills of Ephraim are noted for vineyards. Of late industrial crops like cotton and sugar beet have been introduced. Israel is still dependent on imports for 85 p.c. of its bread cereals.

The industries are being expanded greatly. Industrial production is increasing by 15 per cent per year. The principal

anufactures are chemicals, metal products, textiles, plastics, ass and ceramics, soap, cigarettes, beer and matches.

The exports of the country are citrus fruits, textiles, wines, emicals, electrical goods, cement, glass, pottery, and textile rn and fabrics. U.S.A., U.K., West Germany and Belgium e the principal buyers. About 70 p.c. of exports consist of dustrial goods.

The main markets are the U.S.A., U.K., West Germany, itzerland, Netherlands and Belgium. In the matter of earn-gs, tourism is second only to citrus products. The important ade centres are *Jaffa, Haifa* and *Tel-Aviv* which are also ports. aifa is the natural outlet of the country; it is a port as well a railway centre and has an oil refinery.

Iraq : The Republic of Iraq is situated between the ersian and the Arabian Highlands and has an area of 438,466 km. The greater part of the country consists of lowland hich is drained by the Tigris and the Euphrates. Popula-on is about 9·7 millions.

Cultivated lands form only 8 per cent of the total area, these support more than 80 per cent of the people. Barley, ates, tobacco, cotton and wheat are the principal crops. griculture is practised in the southern alluvial plain with the elp of irrigation. This area is drained by the Euphrates and Tigris and is threaded and criss-crossed with water-chan-els. The southern part of the plain is always in danger of in the spring time when the snow melts on the moun-of Kurdistan and Anatolia. The country has undertaken large irrigation and flood control programme in the Tigris-uphrates valley to bring over 4 million hectares under culti-ation. Dates have been and still are Iraq's most important gricultural product, and Iraq supplies about 80 per cent the world's trade in this commodity. The dates are pro-ced mainly in the Basra area, packed in boxes and are nerally exported to Europe and the U.S.A. The Shatt-el-ab near Basra is the area where extensive date-palms are und. Iraq has about 1 million acres of land under cotton ultivation and the production is 350,000 metric tons a year. for sugar, tea and coffee, Iraq is self-sufficient in essenti-

al foodstuffs. With improved agricultural methods, extended irrigation, more capital, and better communications, Iraq would be able to export foodstuffs.

Iraq is not highly industrialised but there are a number o factories of textiles, soap, vegetable oil, cigarettes and cement Recently the Government has set up a Development Board t bring about rapid industrialisation in the country with the hel of oil royalties. The nationalised industries consist of cement asbestos, steel, spinning, paper and trading companies.

With the exception of petroleum, the minerals of Iraq ar not important. The oil industry in Iraq has been developed b foreign concerns whose shares are held by the British, American and French. The oil fields are found in the north-east from where a pipe-line has been extended to Haifa and Tripoli on the Mediterranean coast—a distance of about 1800 km. The principal oil-fields are at Kirkuk, Ain Zalah (north-west o Mosul), Old Basra Vilayet (southernmost part of Iraq), Rumaila and Khanaquin (near Persian border). The oil production is on the increase every year. Iraq raised a little above 75.(million tons of petroleum in 1970 as against 4 million in 1949.

From its Kirkuk oil-field, oil is pumped through two pipe lines to the Mediterranean coast at Tripoli in the Lebanon and Haifa in Israel. The oil pumped to Tripoli has at present t be taken in tankers to Haifa to be refined as there are no refi neries at Tripoli yet. The Kirkuk oil-field supplies the majo portion of Iraq's oil. An oil-field near Khanaquin adjacent t Iran is also worked.

The principal exports are oil, hides and skins, wool, barley dates and horses. U.S.A. supplies about 20 p.c. of total import of Iran. The other sellers are U.K. West Germany and Japan The imports are iron and steel goods, cotton piece-goods, sugar tea, chemicals, silk goods and hides and leather.

The important trade centres are Basra, Mosul, Kirkuk Baghdad. *Basra* is situated on the western bank of the phrates about 59 miles from the Persian Gulf. The river navigable by ocean-going steamers to Basra, whence smalle vessels ascend the Euphrates and the Tigris to Baghdad. The

is a railway line between Basra and Baghdad—a distance of 353 miles. Basra is the principal port of Iraq. Its proximity to Iran, Arabia and the Persian Gulf makes it a trading centre of high importance.

Afghanistan : It has an area of about 657,500 sq. km and extends 600 km from north to south and 900 km from east to west. At present both U.S.A. and U.S.S.R. are involved in the development programmes of the country. The population is about 17 millions. Agriculture is pursued on the river valleys with the help of irrigation. The important agricultural products are cotton, wheat, barley and tobacco. Fruits are grown extensively and form an important item of commerce. Afghanistan contains a varied list of minerals. Both iron ores and coal are found in large quantities in the mountain regions of Central Afghanistan. Pastoral industry is practised for meat and wool.

Afghanistan is giving priority to the mineral and power sectors of the economy. However, as yet the government has not been successful in attracting foreign investment into mining. Copper, lead, iron and petroleum exist in good quantities. There are factories for the manufacture of woollen goods, leather, matches, cotton goods, sugar and carpets.

The exports are wool, fruits and silk. India is Afghanistan's biggest customer of fresh and dried fruits. The chief imports are cotton piece-goods, metals, leather and arms and ammunition. *Kabul, Kandahar* and *Herat* are the principal trade centres.

Arabia : Arabia is divided into a number of autonomous and protected States. These States are Saudi Arabia, the Yemen, Muscat, Oman, Bahrein, Kuwait and Qatr along the Persian Gulf.

The greater part of Arabia is accessible to the sea. The region is practically a desert, with no lake or navigable river. The relief is mountainous with lowlands near the sea-sides. Agriculture is carried on in the lowlands near the seaside. The famous *moka coffee* is grown in Yemen. Pearl fishery is important in the Persian Gulf. Desert climate, inadequate transport facilities and the nomadic character of the people have retarded the general trade development of the country. The most important product is the petroleum which has made

Arabia the second largest oil producer in the world. Petroleum, coffee, dates, pears and dried fruits are the principal exports while textiles, arms and ammunition, sugar and rice are the imports. The principal towns are Muscat, Mecca, Medina and Jeddah.

Aden, a British colony (including Perim and Kuria Muria islands) in south-west Arabia, 150 km from the entrance to the Red Sea, is an important bunkering station on the highway to the East. It has great importance as a naval and air-force station. Aden produces large quantities of salt and manufactures cigarettes. It has also a large distributing trade in cotton goods, coffee, sugar and tobacco. The imports are mineral fuels, cotton and silk fabrics, radio, motor vehicles, leaves for chewing, camera, watches etc. U.K. Yemen, India, and Aden Protectorate are the principal buyers.

Bahrein with an area of 598 sq. km and a population of 110,000 is the main off-shore island of the Arabian peninsula. It is remarkably insulated from the turbulent currents of Arab political life and has a government best classified as benevolent despotism. Oil is the single most industry accounting for 75 p.c. of the total state revenue. *Safaniya*, off the coast of Saudi Arabia, is the largest offshore oilfield in the world.

Saudi Arabia is a sovereign unitary kingdom with a population 7.7 million. The greater part of the country desert. The Holy Places of Islam are located in the kingdo Wheat, barley and millets are grown in the coastal plain mountain valleys and oases. Yemen is noted for its coffee. Oil is the most important asset of Saudi Arabia, whose operatio are in the hands of U.S.A. interests. The principal oil-field at Abquaib. The next most important producers are the Ain Dar and the Dammam oil-fields. Several other oil-fields being developed in the south of Ain Dar. There is a big refinery at Ras Taunra, though some oil is sent to Bahrein island by pipe-line for refining there. Saudi Arabian reserves are among the largest in the world. In 1970, th crude oil production was 176 million metric tons as again 19 million tons in 1948. The royalties from oil are the important sources of income to the Government. Spectacular developments in oil operation have brought Saudi Arabia into

rominence. Long distances between populated areas and the lifficulty of overland transport are major obstacles to the economic development of Saudi Arabia. Considering the fact hat the country is so vast, the presence of 4000 miles of modern oaved roads is not adequate. There is a plan to construct a 1000 mile highway across the whole Arabian peninsula from Red Sea to the Arabian Gulf. The chief exports are petroleum, dates and horses. Almost all the requirements of the country are imported. West Europe supplies 40 p.c. of imports, followed by U.S.A. and Canada and Asia. India exports jewellery, otton piece-goods, spices, and tea. Some engineering goods re also imported from India. *Riyad* is the capital and has bout 450,000 population. The chief ports are *Jadda* in the west and *Dammam* in the east. The other towns are Mecca, Medina and Yenbo.

Turkey with an area of about 756,855 square km and 33 nillion people is a country between two worlds—the industrial Europe and the underdeveloped lands of Asia. The situation of the country at the junction of Asia, Europe and Africa has influenced greatly its political, social and economic levelopment. Turkey has natural frontiers on all sides and bounded on the west by the Aegean Sea, on the south by e Mediterranean Sea and Iraq and on the east by the mountains. Before the construction of the Suez Canal, Turkey ominated caravan traffic between Asia and Europe. It is rough Turkey that a possible railway route to Pakistan and urope may be built in future.

Agriculture is the main occupation of the country, supporting as it does more than 80 per cent of the people. Citrus uits, olives, grapes and tobacco are cultivated on the Mediterranean coastal region. Turkey is a large producer of bacco which is well-known for its mildness, aroma and sweet ste. Wheat, cotton and barley are also cultivated.

There are about 12 million sheep which yield coarse ool for the manufacture of carpets. The hair of goats supplies the material for the manufacture of mohair.

Turkey has a varied list of minerals like coal, lead, pper, antimony, lignite, and chromium, but none of these

minerals except chromium is found in abundance. Turke *supplies about one-sixth of the world's chromium.* The or deposits are scattered over Asia Minor, and in the south al the Mediterranean coasts. The production of petroleum i increasing fast. From 26,000 tons in 1953, it has increased t 3.5 million tons in 1970.

The country is also rich in forest resources. There is a considerable amount of unharnessed water power. Cottage industry, even today, remains more important than the factory system. The principal manufactures are rugs, carpets, cigarettes, sugar and cotton goods. The public sector is concerned with cement, paper, iron and steel and woollen fabric Recently, a new steel plant has been set up at Eregli.

The economy of the country is being sustained by a massive foreign aid programme.[5] The problems of Turkey is to find new export markets for her infant industries. Because of her link with Cento, Turkey has economic ties with West Germany, Iran and Pakistan. Both in respect of export and import, U.S.A. is the most important country to Turkey. The other countries are U.K. and Japan. The exports consist of tobacco, rasins, raw wool and raw cotton, and the imports are iron and steel goods, textiles and sugar. India exports tea, jute cloth and bags, coir yarn and shellac. A number of harbours are being constructed in Turkey to facilitate shipping. *Mersin* is the largest Turkish harbour.

Large cities are few in Turkey. *Ankara* in Inner Anatolia is the capital of the Republic. *Ismir, Adana, Konya* and *Bursa* are other important cities.

QUESTIONS

1. Japan has made tremendous progress in the matter of industrial development. State briefly how it has been possible for her to do so.
2. What are the principal industries of Japan ? Where are they situated ? State the sources of supply of the raw materials of those industries.

[5] Its proximity to the Soviet Union is a guarantee of the abiding strategic interest on the Western Powers. Also, its proximity to Western Europe makes it a tempting market for the European exporters of capital goods.

3. Give an account of (*a*) the natural resources, and (*b*) the climatic nditions of Japan, and show how they have affected her development.

4. Write a short geographical essay on the population problem of ıpan.

5. Describe briefly the principal fishing areas of the world and :count for the rapid growth of modern fishing along the shores of Japan. (Cal. I. Com. 1956).

6. Write a balanced geographical account of sericulture and silk ıdustry of Japan. Indicate the chief centres of the industry, the areas roducing the raw materials and the present position of the industry. (Cal. B. Com. 1956).

7. 'Japan is often described as the Britain of the East.' Justify this atement in the light of what you have read about the economic ;raphy of these two countries. (Cal. I. Com. 1955).

8. Evaluate the importance of sericulture in the economic life of the apanese people under the following heads: (*a*) sources of raw materials, *b*) centres of manufactures, (*c*) market. (Cal. Inter. 1957).

9. Discuss the conditions—physical and economic—underlying the tern of hydroelectric power development of Japan. (Delhi B. Com. 1964).

10. Give a concise geo-economic account of rice culture in Japan. (Delhi B. Com. 1965).

11. Examine the advantages and disadvantages of industrial deve- ment of Japan and give a brief review of the two most important nufacturing industries of the country in regard to sources of raw terials, items of manufactures and market. (Cal. B. Com. 1964).

12. Write geographical reason why Middle East countries though h in petroleum have no important manufacturing industries. (Indian Institute of Bankers, 1967).

13. Estimate and locate the mineral wealth of China. What are present difficulties for the development of mining in China ? (Cal. Inter. 1942 ; Delhi Univ. B.A. Hons. 1951 ; Agra 1953).

14. "Japan must trade to live." Discuss. (Delhi B. Com. 1968).

15. Discuss the position of China as a supplier of industrial raw terials. How is the conquest of China likely to help Japan in its bid commercial supremacy in the world ? (Cal. B.A. Hons. 1941).

16. Estimate the influence of rivers in the development of agricul- re and communication in China. (Cal. I. Com. 1955).

17. Write short notes on the following:

(*a*) Fisheries of Japan.

(*b*) Principal exports of Arabia. (Indian Institute of Bankers, 1967)

18. Examine the patterns of distribution and density of population in Asia. (Delhi B. Com. 1969)

19. Make a critical assessment of mineral resources of Japan.

20. "Japan must trade to live". Explain. (I. I. Bankers, 1971)

ECONOMIC AND COMMERCIAL GEOGRAPHY

VOLUME TWO

INDIA AND HER NEIGHBOURS

PART THREE

CHAPTER XVI

REPUBLIC OF INDIA

1. Introduction

n respect of size, the Republic of India is the seventh tic state in the world, being preceded by the U.S.S.R., ı, Canada, Brazil, the U.S.A. and Australia. India ıres 3,219 km. from north to south and 2,977 km. from to west and presents the form of a somewhat irregular ateral triangle. She has 3,276,141 square km. of area with million population including Kashmir. Administra-, the country consists of 20 States which are federating and 8 territories which are centrally administered. The s are Maharashtra, Gujarat, Madhya Pradesh, Rajasthan, · Pradesh, Andhra Pradesh, Assam, Mysore, Bihar, Orissa, l Nadu, Punjab, Haryana, West Bgengal, Kerala, Jammu Kashmir, Nagaland, Himachal Pradesh; Manipur and ıalaya. The Union territories are Delhi; the Andaman Nicobar Islands; the Laccadive, Minicoy and Amindivi ds; Dadra and Nagar Haveli; Goa, Daman and Diu; licherry; Tripura and Chandigarh.[1]

India occupies a highly favourable situation for the pur- of international commerce. She stands almost at the re of the Eastern Hemisphere and at the head of the an Ocean. She commands all the sea routes for trade een the old and the new worlds—towards Africa and Europe he west, Australia in the south—Thailand, China, Japan America in the east. Her land frontier is 13,168 km. long and

[1] Arunachal Pradesh and Mizoram in Assam have not yet acquired the of States, and till then the two will continue to be centrally admini- as Union territories. It may be mentioned here that the determin- actors in the creation of a State in India are the cultural homogeneity, ility of economic development, administrative convenience and the from the point of view of unity and security of India.

touches Pakistan, Bangladesh, China, Burma, Afghanistan a Nepal. While there are sea frontiers in the east, west and south, t mountains on the north act as a natural frontier. Both t frontiers are important for defence and yet not hinder t development of commerce. Also, her location between t densely populated areas of Burma, Malaysia, Indonesia a Thailand on the east and the industrially developing Mid East can make her one of the greatest commercial nations of t future.

India has a coast-line of 5,689 km. The coast-line of Indi in spite of its great length, is broken by only a small number inlets and possesses a few islands round it. The continent shelf of the country is shallow and the shores are usually fl and sandy. Because of these physical characteristics India po sesses only a few major ports and harbours in proportion to h coast-line. The Gulf of Cutch, the Gulf of Cambay, the bac waters of Cochin and Malabar, the Palk Strait and the Gulf Mannar, and the indentations at the mouths of the Ganga a the inlets and straits of India. Those are all shallow with t exception of the *backwaters* of Cochin and Malabar and perm navigation when they are made deep by dredging operations.

The east coast of India runs from the mouth of Kalindi i Khulna on the border of Bangladesh along the Sundarba in a westerly direction, to the Hugli river. From the Hug the coast proceeds south-west to the Kistna Delta, from whe it continues south to Cape Comorin which is the southernmo point of India. *The west coast* runs from Cape Comorin. Th coast runs north to the Gulf of Cambay, where the Kathiaw Peninsula juts out west from the mainland.

The vast coast-line of India along with a continental she of more than 15,000 square km. and a large number of gulfs a bays indicates the great possibilities of marine resources in t form of sea-weeds, fish and minerals. Sea-weeds about whi no proper survey has been made so far can be a good source food. These can also provide raw materials for many chem cal industries. The Indian Ocean also contains several mine resources like salt, sodium, potassium, magnesium, bromine a chlorine. Except for salt, the other minerals are not explo to a large extent because of cost and complications in operati

1. The Natural Divisions of India

I. The Himalayan system.
II. The Indo-Gangetic plain.
III. Peninsular India.

The Himalayan system of the north. The Himalaya for about 3,000 km. from the eastern extremity of Assam e western limits of Kashmir with a breadth varying from o 350 km. and contains some of the highest peaks in the l. The Himalaya, a series of parallel ranges intersected by ys and extensive plateaus, rises abruptly from the plains in ast and gradually in the west. The average height of the ılaya is over 17,000 ft., and about forty peaks are known ceed 24,000 ft.

The Himalayan chain acts as a natural protective wall for and even though in the modern age it cannot be consi- as a very safe barrier, yet it does prevent sudden invasion s the north. The Himalaya provides rain-water for the ıs by arresting the moisture-bearing clouds of the south- monsoon. And in winter it prevents the piercing cold s of Central Asia from coming into India. It gives birth ighty rivers like the Indus, the Ganga and the Brahmaputra ; with their tributaries. The Himalayas are very rich in al and forest resources. There are extensive tea planta- in the Outer Himalaya from Assam to Punjab. Physical ulties do not permit cultivation except in the 'Lesser alaya where rice, chillies, ginger, tea, wheat and fruits are d.

The heat in the plains during the summer induces many ple to move up to hill stations of the Himalaya like eeling, Nainital, Ranikhet, Mussoorie, Simla and others.[2] scenery and mighty peaks of the Great Himalaya also ıct tourists and climbers from different parts of the world. such movements of people have encouraged the development

[2] The movement to hill-stations during summer months is a new omenon among the rich and the middle class people in cities. More anything else, it has come as an important source of income to hill le who can now find employment in hotels and other organisations. ing to the needs of the visitors.

of *hotel industry* in many hill stations. With better means of communication by road and rail, the hill stations are likely to attract more people from the plains. The scenically magnificent Himalaya with its peaks higher than the highest of the world, Ski slopes, hunting grounds, picturesque and hospitable hill people, and ancient temples and monasteries can make India *a power in World Tourism.*

II. *The Indo-Gangetic plain.* The plain occupies the greater part of northern India and covers more than 2,500 km. from east to west with a width of 350 km. This plain is formed by the basins of the Ganga, the tributaries of Indus and the Brahmaputra and has been the cradle of Indo-Aryan civilization from the earliest times. The geographical advantages are (*a*) fertile soil, (*b*) favourable climiate, (*c*) flat surface rendering possible the construction of roads and railways, (*d*) rivers for irrigation and navigation and (*e*) mineral products etc. In the *Gangetic plain,* rainfall is heavy and agricullure is the chief occupation of the people. It contains more than 40 per cent of the total population of India. *The Western plains* beyond the Ganga is more or less dry. Mention may be made of the Thar Desert which covers an area of 180,000 sq. km. in Rajasthan with six million population. This desert is actually the north-western portion of Rajasthan and was the cradle of the Indus Valley civilization. Strong winds sweep the desert, take away soil or deposit sands over it. Consequently, the desert is marching towards the east. Agriculture is practised with the help of irrigation.

III. *Peninsular India* is a tableland and lies within the tropics. It is bounded on three sides by mountains—on the north by the Vindhya and the Satpura ranges including the Malwa and the Aravalli plateaux, on the west by the Western Ghats and on the east by the Eastern Ghats. Two coastal strips of flat land exist on the outer side of both the Western and Eastern Ghats—the western coastal strip is known as the Konkan in the north and Malabar in the south; the eastern coastal strip is known as the Coromondal Coast.

The Western Ghats run along the Malabar coast of India continuously for a distance of about 1,500 km. down to Cape Comorin. The plain between the Ghats and the sea is 50 to

60 km. wide. The Ghats look like an immense wall facing the ocean. The mean height is about 3,500 feet, the highest point being 8,700 feet (Dodabetta).

The Eastern Ghats stretch from the Mahanadi river valley for about 750 km. south-eastwards to the nucleus of the Nilgiris. The mean height of the Eastern Ghats is scarcely more than 1,500 feet. The Eastern Ghats are much less elevated and do not form a continuous chain like the Western Ghats. The Eastern Ghats are at a much greater distance from the coast, the intervening lowlands averaging from 80 to 120 km.

As the general slope of the lableland is from west to east, most of the rivers flow into the Bay of Bengal. The Mahanadi, Krishna, Pennar, Cauvery and Vaigi flow into the Bay of Bengal. The only rivers which flow into the Arabian Sea are the Tapti and the Narmada. The Peninsular rivers are all rain-fed, and they turn into mere puddles during the dry season. There are a number of coastal streams which are short in length and have limited catchment areas. The principal agricultural crops of the Deccan are cotton, tea, coffee, and spices. Cinchona, cocoanut and forest products are also available.

In the Deccan, there are five natural divisions: (*i*) The narrow west-coast region from Tapti to Cape Comorin receives the full force of the current of the monsoon from the Arabian Sea and, therefore, rainfall is over 100". The soil is very fertile and the crops are rice, spices and fruits. (*ii*) The Black Soil region consists of deep basaltic soil, which is highly retentive of moisture and, therefore, does not stand in need of irrigation. It is extremely fertile and owing to the lime it contains, the region is suitable for cotton growing. Millets, oilseeds and wheat are also cultivated. (*iii*) North-eastern Deccan has poor soil, but the rainfall is over 30". Tank irrigation has developed most. Rice is the principal crop. (*iv*) Southern Deccan is a *rain-shadow* area, and is frequently visited by famine. The soil is very poor and cultivation is possible only by means of irrigation. The density of population is, therefore, not high. (*v*) The Eastern coastal plain is a low, alluvial land. The northern portion has summer rain and the southern region has winter rain. The coast-line is broken by the deltas of the rivers and many lagoons. The average rainfall is between 40" and 50". Rice is the principal crop. Millets and indigo are also raised

2. The Climatic Characteristics

India is so vast in size and so varied in topographical features that a unifom climate does not prevail all over the country. There are tremendous differences between regions in respect of temperature and rainfall[3]. For the purpose of climatological studies, India can be divided into two parts—Peninsular India and Northern India. Peninsular India has the characteristics of a tropical climate. The temperature is uniformly high and its seasonal variation relatively low.

Northern India lies beyond the Tropic of Cancer. In this region climatic conditions show no general similarity. The western side is very hot in summer and very cold in winter. Air is generally devoid of moisture. But on the eastern side winter is mild and summer is hot with plenty of moisture in the air. The western side includes Punjab and Rajasthan. The eastern side embraces West Bengal, Assam, Bihar and the U.P.

These climatic conditions are disturbed by the monsoon winds. The word "Monsoon" comes from the Arabic word "Mausim" (meaning season) and in India monsoon means the rainy season. There are two Monsoon currents—the South-West Monsoon and the North-East Monsoon. The South-West Monsoon blowing in-shore, carries with it particles of water and gives rain from June to September. The South-West Monsoon contributes nearly 75 per cent of the total rainfall in India and reaches the country in two currents—the Arabian Sea current and the Bay of Bengal current. In the pre-monsoon period of March to May, India gets about 10 p.c. of the total rainfall.

The Bay of Bengal Moonsoon current, after being obstructed by the Arakan mountains and the Shillong plateau on the east, and the Himalayas on the north, proceeds westward upto the Gangetic plain and causes copious rainfall in Assam. West Bengal, Bihar and U.P. *The Arabian Sea Monsoon,* after sur-

[3] Another dominant feature in Indian climate is the violence of rains nd floods, the violence of heat and winds, and the violence of fluctuations etween wet years and dry years.

mounting the Ghats and giving rains to the Deccan and Madhya Pradesh, meets the Bay of Bengal current in West Bengal and Assam. This combined monsoon is responsible for heavy rainfall in Bengal and Assam.

The South-West monsoon begins to retreat from Northern India in the early part of October, and the retreat becomes complete by mid-December. "This retreat is associated with dry weather in Northern India but with more or less general rain on the coastal districts of Tamil Nadu and over the eastern half or the Peninsula." About 13 per cent of our total rainfall is during the post-monsoon period of October and November.

The *North-East* wind begins in December and lasts till February. During this period dry winds from the belt of high pressure in Central Asia (from the West Mediterranean to Central Asia, and North-East China) pass eastward to Iran and Northern India and cause light rain in Northern India, particularly in the Punjab plains. This rainfall, though scanty, is very important for the *kharif* crops. Another current of cold winds after crossing the Eastern Himalayas moves towards the Tamil Nadu coast and Ceylon, and gives rain to these areas during November and December.

The average annual rainfall in India is 42 inches and the variations from the normal rainfall are surprisingly great. The overall departures from the normal are as great as +12″ and −11″. These variations affect the growth and yield of crops adversely. Again, the distribution of rainfall in India depends largely on the physical features. "If the hills and mountains of India were effaced, the country would receive much less rainfall and would not be able to support its present population."

The economic importance of rainfall in India is of the highest order, inasmuch as rainfall is an imperative necessity for agriculture. The prosperity of most Indian districts depends to a large extent on the success or failure of the monsoon, and a slight variation in the direction of the wet winds may cause a usually well-watered district to become a desert.

One of the chief characteristics of rainfall is its unequal distribution over the country. About 33 p.c. of the total area of India always obtain more than 50″ rain a year, and only seven per cent of the area never get more than 50″ rain. *It is*

not the average rainfall of any region, but the deviation from the normal average, together with its timely distribution, that may cause disaster. A deficiency in the expected rainfall causes famine, and too much rain spoils the crop, while the early or late arrival of the monsoon may spoil the harvest.

About 209 million acres comprising Andaman and Nicobar Islands, West Bengal coastal region, and Assam get more than 50" rain a year. In these areas, agriculture is dependent entirely on the rain. U. P., west Madhya Pradesh, coastal Andhra and Tamil Nadu receive between 30" and 50" rain a year. Below 30" rains are received by the Punjab, Kashmir, Rajasthan, North-South Mysore and Gujarat covering an area of 162 million acres.

The most useful classification of areas, according to rainfall, is made into two great dones,—*'certain'* and *'uncertain'*. The zones of *certain rainfall* include West Bengal, Assam, the West Malabar Coast, the Western slopes of the Ghats and the Upper valley of the Narmada.

The zones of *uncertain rainfall* include the U.P., Western and Northern Rajasthan, the Central Rajasthan plateau bordering on the U.P., a large part of the Gujarat State, the whole of Tamil Nadu (except the actual slopes of the Eastern Ghats), South and West Andhra Pradesh and Mysore and some districts in Bihar and Orissa.

The existence of these extensive zones of uncertain rainfall has been the cause of India's famines. *The so-called famine regions of India are not necessarily the regions of low rainfall —rather they get moderate rainfall with little or no provision for irrigation works.*

Though the climate of India is enervating,—the mental and physical energy of her people has not been affected adversely. Few nations had such a glorious past in arts and literature and science and technology. India even today enjoys world-wide reputation in the matter of superiority of designs in handicrafts. Her people do not consider climate to be a deterrent factor.

3. Soil and Soil Regions

Eight soil regions are generally recognised in India some

of which are quite inclusive of a rather wide variety of soil conditions while others have quite uniform and consistent soil characteristics throughout.

Agriculturally the most important soils are the alluvial ones which occupy extensive tracts of land and include the greater parts of Gujarat, Rajasthan, Punjab, Haryana, the Uttar Pradesh, about half of West Bengal, the Godavari, Kistna and Tanjore districts in the south and Assam. The eastern and western coastal lands of the Deccan are lowlands of alluvial formations

The alluvial soils are rich in chemical properties and are capable of yielding a large variety of *rabi* and *kharif* crops. The alluvial soils are deficient in phosphoric acid, nitrogen and humus; lime and potash are sufficient. In characteristics, these soils belong to the *brown steppe* soil group which is found in Russia, North America, Australia, Africa and South America—usually at the fringe of desert soils.

The alluvial soils of the Upper Ganga valleys are dry porous and in some places sandy, yielding crops that do not need the retention of much moisture about their roots. At present in these areas cultivation has much developed with the help of irrigation. The absence of hills makes it easy and comparatively cheap to make canals and distribute the water over the length and breadth of the Ganga valley. The alluvial tract of Bengal are more compact, less coarse and more moist than elsewhere and yield rice, jute, sugar-cane, tobacco, etc., rather plentifully. The alluvial soils of the Deccan coastal strips are non-porous, clayey and of a dark colour.

The black soils comprise the greater part of Maharashtra Gujarat, the western part of the Madhya Pradesh, south of U.P., south-east of Bihar, north-west of Orissa, and the western part of Andhra Pradesh. The soils of this region vary in different parts in character and productiveness. The soils are poor, thin and porous on the slopes and the uplands of the Deccan hills where millets and pulses are main crops. In the lowlands, the soils are deeper and darker-coloured, suitable for wheat, millets and cotton. The most important soil in the Deccan trap area is the *regur* or *black cotton soil*, found mainly in the valleys of the Tapti, the Godavari, the Narmada and the Krishna and parts of Madhya Pradesh and Gujarat. "This soil

is the product of the decomposition of lavas. It is of a dark colour and is exceedingly compact and tenacious. It is highly retentive of moisture and rich in chemical properties." Cotton, jowar, wheat, linseed and gram are cultivated in these areas.

Red soils comprise the whole of Tamil Nadu, Mysore and South-east Maharashtra and extend through the east of Andhra Pradesh and Madhya Pradesh to Orissa and Chotanagpur. It is also found in the Santhal Parganas and the Birbhum district of West Bengal, the Mirzapur, Jhansi and Hamirpur districts of Uttar Pradesh, Madhya Pradesh and eastern Rajasthan. The consistency, depth and fertility of the soil vary widely in different areas. The poor, sandy and light-coloured soils of the arid uplands yield only bajra, while the rich, deep, bright-fed fertile loam of the plains produces a wide range of excellent crops. Although the red soil tracts are drained by the Mahanadi, Godavari, Krishna, and Cauvery, the use of water by means of canals for irrigation is absent because of the uneven surface except at the deltas. The construction of wells is also difficult because of the rocky nature of the surface. The red soil areas are, however, admirably suited for storage of rain-water in tanks. In Tamil Nadu, Mysore and Western Andhra Pradesh, cultivation is carried on with the help of tank irrigation.

The laterite soil is found in Andhra Pradesh, Assam, Arunachal, Meghalaya, Nagaland, West Bengal, Orissa and along the Western and Eastern Ghats. The soils are formed by the weathering of laterite rocks. "The distinguishing peculiarity of these soils is their acidity, and the main agricultural problem is the correction or amelioration of this acidity". Since the tea plant requires acidity, tea-plantation is common in these areas. The laterite soil differs widely from one region to another. Generally speaking, they are poor on the higher levels and cannot retain moisture. In the plains, however, they consist of heavy loams and clays and can easily retain moisture.

Mountain and hill soils are suitable for the growth of forests in the hilly parts of the north and specially in Darjeeling, Almora and Garhwal districts. *Terai soils* are covered by tall grasses and shrubs of no agricultural value. These are found in a narrow strip in the Uttar Pradesh and Bihar between plains and hills including Nainital, Pilibhit, Kheri, Gonda, Basti and

Gorakhpur. The eastern strip of Kerala has also this soil. *Arid* and *desert soils* are found in Rajasthan and mostly contain sands, often with high soluble salt contents. These soils have very low organic matter. Certain parts of Kerala and Bihar contain *peaty and other organic matters. Sub-montane soil* is confined to the whole of Simla, most of Kangra and part of Gurdaspur in Punjab.

Problem of Soil Erosion

For the success of agriculture in India, it is necessary to maintain a high fertility level of the top soil. As the top soils are usually six to twelve inches in depth, care must be taken in the proper use of land. Waterlogging and the consequent salinity and alkalinity which have become quite common in many irrigated areas, have brought great soil deterioration. There can be no increase in agricultural production unless efforts are taken to retain and use soil judiciously. In other words, soil conservation is essential to continued agricultural prosperity.

Unfortunately, however, in India today many soils have become so depleted in fertility or so eroded that they are no longer suited to agriculture. Soil erosion occurs in Bundelkhand, Madhya Pradesh, Bihar, parts of Maharashtra, Tamil Nadu and Punjab (composite). In the areas of Maharashtra-Deccan alone about one-third of the land has become unfit for agriculture on account of soil erosion. In Orissa 4,200 sq. km. of area have been affected by erosion. In Punjab and Haryana, too, large areas of fertile land have been rendered useless by soil erosion. In fact, soil erosion is an age-old problem.

The progressive deterioration of soil in India is one of the main causes of India's low productivity in agriculture. "It has been estimated that about 100 million hectares of land, that is, almost a fourth of the country's land surface is suffering from soil erosion."

The agencies of erosion are winds, water and waves, of which, in India, the water erosion is most pronounced. There are three kinds of water erosion—*sheet, rill and gully.* Sheet of surface erosion takes place in the form of uniform removal

of soil from the surface of sloping lands by rain-water. In the hills-tracts of Assam, North Bihar and the Kumaun region of Uttar Pradesh, such loss of soil is steadily going on. Sheet erosion develops so slowly that its injurious effect is not noticed before serious damage is done. The falling drops of rain lift the soil in the air and splash it back and forth. A grassland cover can save the soil. Rain drop erosion may also be reduced by leaving the soil surface rough with some clods as compared with a smooth and finely pulverised surface.

Rill erosion is common in Bihar, Uttar Pradesh and parts of Madhya Pradesh where rains cause formation of tiny channels on bare soil. *Where such rills are enlarged, they are known as gullies.* Such gullies not only take away the surface soil but also sub-surface and sub-soil. Thus gullied lands are partially or completely abandoned by farmers although intergully areas are used for pasture.

In Rajasthan and the districts of Gurgaon, Hissar and Karnal in Haryana, top soil is removed by the action of winds. From April to July, wind carries sands from western Rajasthan and covers not only the surface soil but also injures the plants with its abrasive action. Wind erosion is a quick process and can take lands out of cultivation in a short period of time.

There is hardly any major agricultural region in India which has not been affected by soil erosion in one form or another either through rain or winds. The top layer which is the most productive part of the soil is thus scattered through erosion over a vast area or blows to the seas. The problem is to take measures for protecting soil from being washed away by water or blown away by wind.

Soils vary in their resistance to erosion. A coarse soil can resist erosion because it can absorb the rains rapidly. Erosion is also influenced by the slope of land. The slope determines the rate of flow of water over a surface. The speed of water in its turn determines its power of eroding. "The important task of soil conservation is therefore to retard the flow of water on slopes and dispose of surplus water through canals." On sloping crop land, contour farming can help conservation of soil and water. This means that when ploughing, planting,

cultivating and harvesting are done at right angles to the natural direction of the slope of the land, the flow of water is interrupted, and the pentration of water into the soil is facilitated. Thus, the manner in which the ploughing is done determines the rate at which rainfall will be taken up by soil.

The Government of India has set up the Central Soil Conservation Board to organise, co-ordinate and initiate research on soil conservation as well, as to assist States in technical and financial matters of soil problems. Already in many parts of Northern India, soils which were poor to start with, have been made fertile and brought into production.

4. The Population Characteristics

The most decisive production force of a country is its distribution of population. The extent of utilization of natural resources is greatly determined by the character and abilities of population. Human beings can become economic resources when they use their physical and mental powers for the services of their countries. Like natural resources, the human powers can be wasted, depleted and reduced in productivity.

The people of India are highly intelligent, enterprising and peace-loving. Their civilization dates back to some 5,000 years before the Christian era. In art, literature, science, architecture and industry, the people achieved fame at a time when the rest of the world was almost dark. The Indians have shown to the world that peoples of different races, languages and religions can get socially adjusted and live with mutual tolerance and respect. In fact, India can claim a pronounced superiority over many countries in regard to the maintenance of democratic ideals because of her way of life as reflected in her love for peace and unity, in absence of racial prejudices, and in adjustment of different social groups and cultures. India is the world's greatest democratic country where transformation of the State economy into a dynamic one has taken place in a few years' time.

The estimated population in 1971 census was 547 millions, giving a density of 156 persons per sq. km. as against the total

population of 434 millions in 1961 with 138 persons per square km.

Population by States: Mid-year Estimates
(In million persons)

States	1951	1961	1971
Andhra Pradesh	31.3	36.2	43
Assam	8.9	12.0	15
Bihar	39.0	46.8	56
Gujarat	16.4	20.8	27
Haryana	...	7.7	10
Kashmir	3.3	3.6	5
Kerala	13.6	17.0	21
Madhya Pradesh	26.2	32.6	41.0
Maharashtra	32.2	39.9	50
Mysore	19.5	23.8	29
Orissa	14.7	17.7	22
Punjab	16.2	11.2	13
Rajasthan	16.1	20.3	26
Tamil Nadu	30.2	33.9	11
U. P.	63.5	74.3	88
West Bengal	26.5	35.2	44
Other areas	5.8	8.0	48
All-India	... 363.4	442.7	547

The density of population per square km. in India is amongst the highest in the world. Although the arithmetical density of population in the country is about 156 per km., on the basis of arable land it is 400 per sq. km. For an agricultural country, such a density is too high, specially when the yield of crops is so low compared with the Western countries.

An alarming feature in connection with the population in India is the increase in the rate of growth. It is estimated that

India's population will be 625 millions in 1976. Unless the rate is arrested or rate of economic growth is accelerated, the country is sure to face many serious problems by way of food shortage, unemployment, lower standard of living, political unrest, etc.

The distribution of population depends largely on the physical environment of a region. Climate, soil, natural resources, topography, etc., largely determine the number of people a given territory can support. In India the density of population is thick in those places where the rainfall is not only heavy but certain as well. Thus Lower Gangetic plain, Upper Gangetic plain, Malabar-Konkan, south Tamil Nadu and the coastal regions of Tamil Nadu and Orissa are areas of high density of population. These six regions support more than 350 million population with an average density of 600 per square km. These areas possess fertile soil, level land and rainfall sufficient for the development of agriculture. But unhealthy regions like the *Sundarbans* in the lower Gangetic delta cannot attract people although these regions receive heavy rain. There are areas in India where rainfall, though scanty, support a large population with the help of irrigation. The western parts of the U.P. have been developed by irrigation.

The areas of low density of population are the Thar desert, the Western Himalayas, the Eastern Himalayas, North-Western hills, North-Central hills and plateaus and North-Eastern plateaus which cover 92 million hectares of land but support only about 90 million population with an average density of 90 per square km. It is because mountains and deserts offer limited scope for agriculture.

About 70 p.c. of India's population still depend on agriculture for their livelihood. All industrialisation and urbanisation during the last 25 years have not been able to reduce the pressure on land. The situation might have been worse however, but for secondary and tertiary employments. The fast-bulging population will have tremendous effects on the future economic development of India.

For many more years, India will have to pay greater atten-

tion to agriculture for its development to sustain India's growing population. About 20 million rural families who depend directly on agriculture, have little or no land and rely on wage earnings. A proper utilisation of this over-abundant supply of agricultural labour, will not only increase output per hectare, but also the total food production. More than this, the level of income of cultivators, which is today barely one-third of the national average will also rise.

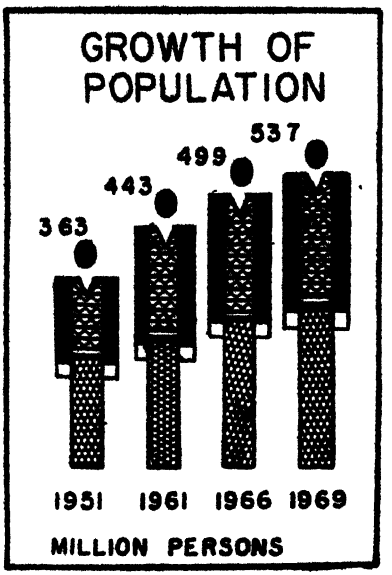


FIG. 75. Growth of Population in India between 1951 and 1969.

The problem of increased and increasing population in India can be solved by a readjustment of population in the different areas, reclamation of waste lands, better utilization of economic resources, growth of manufactures, and expansion of foreign trade.[4] There are already some shifts of population from agriculturally congested areas to industrial areas. Every year Bihar, Orissa, Uttar Pradesh and Tamil Nadu send out a large number of persons to other States where they are employed in factories, plantations and mines. Assam, Maharashtra, West Bengal, and Madhya Pradesh receive the majority of these emigrants. A large number of emigrants from Bihar, Orissa, Uttar Pradesh and Madhya Pradesh have settled in West Bengal. Of the total immigrants who have settled in West Bengal from other States, about 60 per cent are from Bihar and Orissa and 18 per cent from Uttar Pradesh. These people are mostly employed

[4] Side by side with these measures, the country has undertaken in a big way the family planning campaign in order to restrict the number of children in each family through persuasion and medical help.

in the mills and factories of the Hooghly basin and in the tea plantations of the Darjeeling district.

Tea-plantation and large tracts of cultivable lands of Assam have attracted many immigrants there and today these people form about one-fourth of the total population of the State. For tea-plantations the recruiting grounds are Bihar, Orissa, Madhya Pradesh and Tamil Nadu. Inter-state migration of population is perhaps a possible solution for many of India's population problems, but then, there are certain obstacles in the way. People have many ties to the land they now occupy, though after the partition of India and with the influx of refugees, this factor has become less operative. Then there is the cost of travelling, *domicile* restrictions and the cost and labour incurred in building their new homes. Although difference in population pressure between adjoining States has not become a cause of an inter-provincial conflict, yet restrictions in respect of jobs for outsiders in one or two States in the interest of local people are not uncommon.

Emigration of population outside is an important measure for relieving the pressure in many countries in Europe. But this is a measure which is dependent entirely on the attitude of the countries that could absorb such surplus. At present, a little above four million Indians are outside India, of whom 2.7 millions are in the Commonwealth countries. Nearly 75 per cent of the Indian emigrants live in Burma, Ceylon and Malaysia. The majority of them are employed in sugar and rubber plantations and in mining. The present population of Indians in Burma is almost 7 lakhs. Indian immigration into Burma is subject to regulation and restriction in regard to purchase and transfer of property by non-Burmans. The Indians as such have no franchise. Those Indians who have become Burmese citizens are, however, entitled to all privileges.

Ceylon has nearly 20 per cent of the total Indian emigrants, forming, as they do, about one-seventh of the total population of Ceylon. They are mostly engaged on the tea and rubber plantations. The emigration of Indian labour to Ceylon has declined in recent years because of restrictions against the settlement in Ceylon. Malaysia contains 15 per cent of the Indian emigrants whom it engages in mines and plantations. It

appears that both Ceylon and Malaysia have reached the saturation point and cannot absorb any more Indian labour.

Nor is the position of Indians better in Australia and South Africa. In the early stages of its economic development, South Africa had to invite Indian labour for work on railway construction and in mines. In South Africa, there are 220,000 Indians (the great majority of whom were born in that country) consisting of labourers, traders and professional people. The present policy of the South African Government is to curtail civic rights of the Indian immigrants, "restrict their opportunities of acquiring land outside well-defined areas, and limit their choice of employment for the sake of saving white south Africa." The Australian Government has put restrictions on the immigration of Asians on economic grounds.

In order to obtain fresh agricultural areas, efforts are being made to reclaim waste land with the help of modern techniques of cultivation. India's capacity to keep pace with the growth of population need not depend solely upon the production of foodgrains and commercial crops but also upon the developments in the secondary and tertiary sectors of the economy. India may not be able to find adequate markets abroad for the very large industrial output which will be necessary to provide employment for, and to improve the standard of living of her massively increasing population. The country has therefore undertaken plans are co-ordinate and parallel development of large-scale basic industries, small-scale agro-industries and agriculture. The problem is not merely to find employment for her population but also to produce more, so that she can absorb most of her own production, agricultural as well as industrial.

Racial Background : India is the only country in the world which contains a great diversity of races at every stage of civilization. It is because various races came from outside from time to time and settled in India.

The *Negroid* or *Negrito* race was the oldest to settle in India from Africa. This has now almost disappeared on the Indian mainland, but traces have been found in the Rajmahal Hills. The Andamanese belong to the Negrito race. Next came the *Proto-Australoids* from Palestine. The aboriginals of Madhya Pradesh belong to this race.

The *Austrics*, a branch of the Mediterranean race, came through Mesopotamia in pre-historic times. They were long headed, comparatively fair, and straight-nosed. They settled in North India. Later they migrated to Burma, Indo-China, Malaysia and Indonesia. They are found today in the hills and jungles of Madhya Pradesh and North-Eastern India, and they form about 1.3 per cent of the total population of India. The Kols, Santhals, Khasis, Nicobarese belong to this race. The *Dravidians* came to India before 3,500 B.C. from the Aegean Island and Asia Minor. These people were highly civilized and built many cities in Sind and the Punjab. As they migrated towards the south and the Gangetic plain, they came in touch with the Austrics and absorbed a large amount of their blood. "They with the Austrics supplied some of the fundamental bases of Hindu religion and civilization." At the present day, the Dravidians live mostly in Peninsular India and form 25 per cent of the Indian people. Next came the *Aryans* from the Northern Mesopotamian regions about 2,500 B.C. via Iran. They had white skin, finely-cut noses and were tall. Today they account for 70 per cent of the population of India and occupy chiefly Punjab, Haryana, Kashmir, Rajasthan and Gangetic plain.

The *Mongoloid* race came after the Aryans. "They appear to have spread from their primitive home in North-Western China about the middle of the first millenium B.C. into Tibet, and in the subsequent centuries they penetrated through the Himalayas and through Assam into the Himalayan regions and the plains of North and East Bengal and the hills and the plains of Assam." These people occupy parts of Eastern Kashmir and Assam.

Because of the topographical conditions, the races which came earlier, were not annihilated by new settlers, but every incoming wave of conquerors pushed them down south and eastward. The hills and forests provided shelter to a large number of primitive tribes who were left there undisturbed. This probably explains why some of the existing racial types in India retain certain primitive strains.

There has been great intermixture, and pure racial characteristics are hardly to be found. The *Aryo-Dravidians* are a

mixed race of Aryans and Dravidians. They occupy Uttar Pradesh, Bihar, Maharashtra, Gujarat, Madhya Pradesh and parts of Bengal. The *Mongolo-Dravidians* are a mixed race of Mongols and Dravidians. They occupy the eastern parts of Bengal and Assam. The *Scytho-Dravidians* are a mixed race of Scythians and Dravidians. They are found in Gujarat and Western Deccan. The Marhattas are of this type.

In spite of the different racial origins, the people of India are not conscious of such differences. The people of India show little interest in tracing their racial origin elsewhere. In fact, the people have always considered themselves as belonging to the same nation. The differences, if any, are related to social customs of a region which in a country of the size of India are inevitable. To a large extent, such differences are also noticeable in many smaller countries of the world.

MAJOR LANGUAGE DISTRIBUTION

State	Language	State	Language
Jammu and Kashmir	Dogri Kashmiri	Mysore	.. Kannada
		Kerala	.. Malayalam
Punjab and Haryana	Punjabi Hindi	Tamil Nadu	.. Tamil
		Andhra Pradesh	. Telugu
Rajasthan	Hindi	Orissa	. Oriya
Uttar Pradesh	Hindi	Bihar	. Hindi
Madhya Pradesh	Hindi	West Bengal	Bengali
Maharashtra	Marathi	Assam	. Bengali Assamese
Gujarat ...	Gujarati		

Languages: India is a land of many languages. According to the Linguistic Survey of India, there are 179 languages of which 116 are current among less than one per cent of the entire population of the country. When one takes into consideration the languages of the large, advanced and organised communities, one will find only 14 major languages in India.[1]

[1] Languages specified in Schedule VIII of the Constitution are Assamese, Bengali, Gujrati, Kannada, Kashmiri, Malayalam, Marathi, Oriya, Punjabi, Sanskrit, Tamil, Telugu and Urdu.

Tamil, Telugu, Malayalam and Kannada in the South are spoken by about 120 million people while about 250 million people speak Punjabi, Hindi, Gujrati, Marathi, Bengali, Assamese, Oriya and Kashmiri. Hindi is the language of 133 million people.

The multiplicity of languages in India has not stood in the way of national integration so far. In fact, every one understands the raison d'etre and the rationale of the presence of many languages in India. Also, Hindi, Urdu and English languages are common in most parts of India. Apart from the fact that Hindi is one single language which is spoken by the largest number of people, one can travel throughout Northern India and a good part of the Deccan also with a little knowledge of Hindi. Hindi is the national language of India. Its acceptance as such does not mean that the regional languages are neglected. In fact, Hindi and regional languages are growing side by side for education, business and administration. For many years, English has been a neutral language in India, and did not give any special privilege to any particular group. Its role for intellectual progress in the past and even today, is quite significant. Both Hindi and Urdu are identical in points of grammar and syntax and can be regarded as really one speech, split into two, by two totally different scripts. Hindi is written in Devnagri script while Urdu is in Persian-Arabic script.

5. Agriculture and Agricultural Products

India is essentially an agricultural country where nearly 70 per cent of the total population depends directly and another 15 per cent indirectly for their sustenance upon land. Indian agriculture is of vital importance to her growing population for food, to her industries for raw materials and to her foreign trade for earning foreign exchange. *India is, today, the largest sugarcane producing country in the world. In the production of rice, millets, tea, groundnuts and linseed, her position is equally important. She holds a virtual monopoly in lac, follows the U.S.A in cotton and Argentina in linseed, ranks with China and Africa as one of the chief millet-producing areas, and leads with China in the production of rice and tea.* Agricultural

commodities account for 40-45 per cent by value of India's exports.

From the point of view of total area under cultivation, India occupies the third place in the world being headed by the U.S.A. and the U.S.S.R. Of the total area of the Indian Republic, the land available for cultivation is about 40 per cent of the total land. The area under cultivation has increased from 13 crore hectares in 1950-51 to 16 crore hectares in 1971.

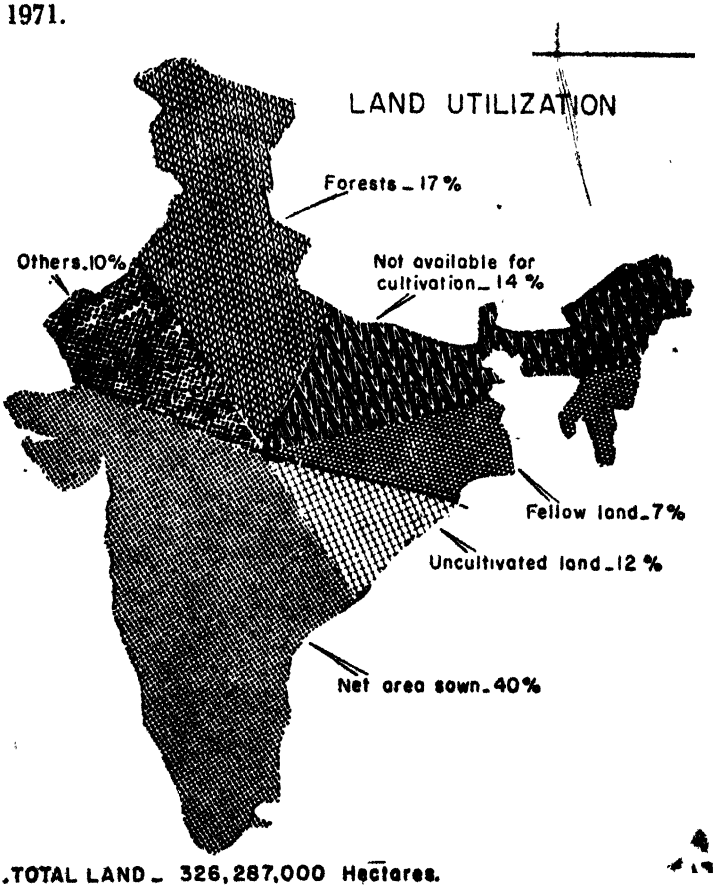


FIG. 76. Land Utilization.

Agricultural operations in India begin with the arrival of the monsoon in India. The crops raised in autumn as a result of the sowings made in June are known as the *Kharif* crops.

The principal Kharif crops are wheat, rice, millets, maize, tobacco, jute, castor, groundnut, and cotton. Another agricultural season commences in winter, the *products* of which are known as the *Rabi crops*. The principal Rabi crops are wheat, barley, gram, linseed, rape seed and mustard. Crops are generally classified in India as follows :

1. *Food crops* : (*a*) Foodgrains, (*b*) sugar, (*c*) condiments and spices, (*d*) fruits and vegetables, (*e*) other food crops.
2. *Non-food crops* : (*a*) Oilseeds, (*b*) fibres, (*c*) dyes and tanning materials, (*d*) drugs and narcotics, (*e*) fodder crops, (*f*) green manure crops and (*g*) other non-food crops.

There are mainly three types of agriculture in India, namely, wet agriculture, irrigation agriculture and dry agriculture, the variations being caused by her topography, rainfall and soil. The wet agriculture is practised in areas which depend entirely on the rainfall with little provision of irrigation for agricultural production. Areas which have irrigation facilities as in the Panjab, Haryana and the Western U.P. are known for irrigation farming. A number of techniques and measures have been taken for moisture conservation practices in areas where the amount of rainfall is very small but the soil potentially good for agriculture.

The following are the prominent features of dry farming : (*i*) ploughing the land in deep soil, (*ii*) terracing the land and division into compartments to allow rain-water to more only under controlled conditions (*iii*) repeated harrowing before swings, which conserve soil and moisture and destroy weeds. *Double-cropping* means that a field is replanted to a second crop after the first has been harvested. There may be also *multiple-cropping* when three harvests are obtained from the same field in the course of the year.

Some problems of Indian agriculture. Agriculture is practised throughout the country, but there are certain areas which offer less opportunities for the cultivation of crops. The areas where the cultivation of land is difficult are: (*a*) Eastern Maharashtra and Eastern Madhya Pradesh—high lands are generally

infertile soil, excepting the black soil : (*b*) Assam—unhealthy climate in several districts as well as dense forests and mountains restricts cultivation to definite areas ; (*c*) Rajasthan, an arid region where cultivation is extremely difficult ; (*d*) the Himalaya where mountains prevent large-scale cultivation ; (*e*) Madhya Pradesh and Orissa have areas where malaria is highly prevalent. Cultivation in these areas is carried on in places which offer better conditions.

Indian cultivators are often described as conservative and inefficient. It has, however, been observed that Indian cultivators do not hesitate to accept new ideas and new methods if they are intelligently explained and demonstrated. Their financial plight, however, makes them cautious and restricts their ability to undertake new practices that require even a modest investment.

Another problem is that the *agricultural productivity of India is lower than that of many other important agricultural countries of the world.* In terms of percentage, seventy persons grow agricultural produce for one hundred persons in India compared to U.S.A.'s 9 persons for 100 persons.

This low productivity of land in India is caused by the (*a*) lack of assured and timely irrigation water, (*b*) the low level of soil fertility, and the general absence of fertilising practices, (*c*) use of indifferent seeds, and (*d*) losses due to incidence of diseases and pests. The occurrence of droughts or floods dislocates agriculture to a point which has its repercussion on the economy of the country.

India's present yield per hectare in most commodities is one of the lowest in the world. In a few areas, however, yields have been increased in recent years by 100 per cent. What is needed is the proper dissemination of knowledge about improved applications on wide scale so that cultivators can improve their efficiency even with current methods. Also, it has been estimated that crops grown in India remove from the soil annually 4.2 million tons of nitrogen, 2.1 million tons of phosphoric acid, 7.3 million tons of potash and 4.8 million tons of lime. In any scheme of crop production, therefore, the efficient use of fertilisers is of great importance. Systematic efforts are being made to increase agricultural productivity in

India, by means of chemical fertilisers and improved seeds. The wide fluctuations in the agricultural output are mainly due to variations in weather. The fertilisers and improved seeds will, without doubt, minimise the effects of such fluctuations.

Still another serious problem is the fact that Indian agriculture is conducted extremely on a small scale. The small size of agricultural holdings along with low yield per acre is forcing many cultivators to leave farming. The cultivated field per rural family is 7.5 acres compared to 491 in New Zealand, 216 in U.S.A. and 38 in Denmark. In Japan, however, it is 2 acres per family.

Whereas in Japan it has been possible to get very high yields per acre, because of intensive cultivation and the increasing use of fertilisers, in India the yields per acre have remained very low for many years. The defects associated with small holdings are serious—but with improvement in farm techniques and management through fertilisers and better seeds, a holding should give more per acre.

Since there is not much scope for bringing additional land under cultivation in India, the Fourth Plan has emphasised on intensive agriculture with following key elements : (*i*) continued expansion of irrigation facilities and improvement in the utilisation of existing potential ; (*ii*) expansion in the use of fertilisers, plant protection materials and farm machinery ; (*iii*) full exploitation of high yielding varieties of seeds for cereals and commercial crops ; and (*iv*) improvement in the agricultural marketing system. The Fourth Plan seeks to ensure in the first instance that provision of material inputs and other supporting services which condition and stimulate agricultural growth should receive top priority. In industry for example, the production of fertilisers, pesticides, tractors and agricultural machinery will be the first charge on the nation's resources. In power, rural electrification programmes which energise tube wells and pumps for irrigation purposes will get precedence. Similarly, in transportation, education and research programmes which have their impact on agricultural development will receive greater attention."

Some Fourth Plan targets are : Foodgrains 129 million tonnes from base level of 90 million tonnes ; sugar-cane 13.5 million tonnes from 11 million tonnes ; cotton 8.6 million bales from 6 million bales and oilseeds 10 million tonnes from 8 million tonnes.

Joint co-operative farming societies are being established. "The contribution of co-operative farming to rural progress will be significant in the measure in which it develops as a voluntary mass movement and co-operation at the village level. The ultimate success of joint co-operative societies will depend on how efficient the management is. The size of a co-operative farm should be such as to make for economic operation and to secure the development of the village economy as a whole. There is also need for alternative ways of accomplishing co-operation in farm operations. The owners of small units can arrange for joint ownership and operation of power, and for use of equipment.

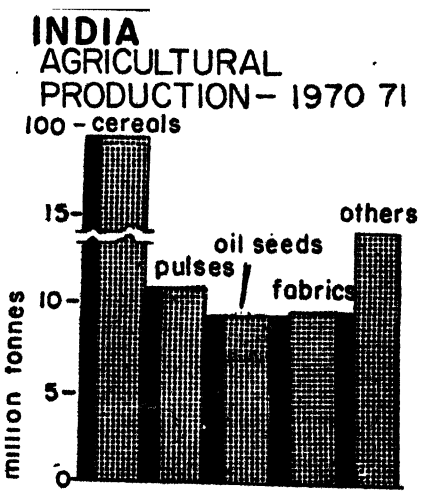


FIG. 77. India—Agricultural Production, 1970-71.

India and her Food Supply : Food crops occupy about 86 per cent of the total acreage under crops in the Union. Although India is one of the greatest agricultural countries of the world, her position with regard to food production is not

yet satisfactory. The food position in India during 1965-66 and 1966-67 was viewed on a war footing because of two consecutive years of drought and decreased production.

In 1966, India imported 10 million tons of cereals of which wheat alone accounted for about 8 million tons. In terms of foreign exchange, India spent over Rs. 500 crores in 1966-67 for wheat and rice. From 1967-68 onward, the food production showed a distinct trend towards improvement. In 1969-70, the total foodgrain production was 99.5 million tonnes. In 1970-71, it exceeded 107.81 million tonnes.

INDIA: TOTAL FOOD PRODUCTION
(in million tonnes)

	1966	1968	1970-71
Rice	30.5	37.6	42.4
Wheat	10.3	16.5	23.2
Coarse cereals			
(*i*) Jowar, Bajra and Maize ...	16.1	21.5	20.7
(*ii*) Others ...	5.2	5.8	6.5
Pulses	8.9	12.1	11.5
Total food	72.3	95	107.8

The foodgrains are normally imported from U.S.A., Canada, Thailand, Australia and Burma. Wheat and milo are imported from U.S.A., mainly under PL 480 agreements, and a little on commercial basis. Australia sends wheat on commercial basis and Canada under International Food Aid Programme. Rice is imported from Burma, Brazil, Equador, Guyana, Thailand, Egypt and U.S.A. India spent Rs. 518 crores in 1967-68 and Rs. 213 crores in 1970-71 for the purchase of cereal and cereal preparation.

The food position has, improved considerably after 1967, because of the timely arrival of the monsoon, and the introduction of high yielding varieties for wheat and rice on a large scale. High yielding rice in Tamil Nadu, Andhra Pradesh and Bihar, and high yielding varieties of wheat in U.P., Haryana and Punjab have brought about a *green revolution* in the country so far as food production is concerned.

The high yielding varieties on jowar in Maharashtra, and on bazra and maize in most states are also giving good results. Green revolution is not a matter of total output only but also of the methods to sustain the revolution to enable the country to meet the problems from expanding population. The

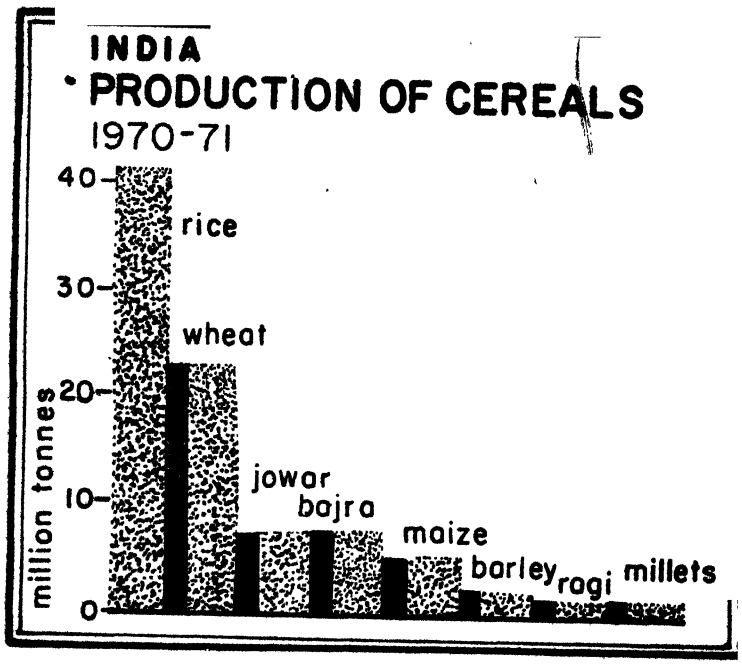


FIG. 78. India—Production of Cereals.

use of high yielding varieties is to be widespread; multiple cropping through short duration varieties is to be promoted: water inputs primarily through minor irrigation is to be increased quickly: and supplies of fertilisers are to be expanded. Definite measures have already been taken to encourage multiple cropping in 6 million hectares. The National Seed Corporation is helping in the supply of various types of seeds. Tube wells—both private and state—are being constructed and pump sets installed.

Side by side with the adoption of measures, the availability of fertilisers and the use of more efficient and better farm

machinery and equipment have created conditions for farmers' prosperity. Soil is no longer regarded as a source of nutrition for plants but a medium for the use of fertilisers. The farmers realise that high yielding varieties of seeds require proper treatment of the land and also plant protection materials all of which means a mechanical break-through in agriculture.

Other Measures : Reclamation schemes are in progress in many States. The Uttar Pradesh Government has carried out some of the biggest reclamation schemes in Asia, except Russia. In Ganga Khadir, in the Meerut District, a jungle-covered tract of nearly 15,000 hectares, has been cleared and sown. In the marshy areas of Terai nearly 16,000 hectares of useless land have been brought under the plough. In Madhya Pradesh the reclamation of land infested with the dreaded *kans* in one of its many outstanding performances. The reclamation operations were started in 1948. *Kans*, with its roots going down to a depth of fourteen inches, was considered to be an ineradicable difficulty and the villagers had misgivings about the success of reclamation operations. Slowly as the work proceeded their apathy was transformed into active co-operation and enthusiasm. The crops produced in the reclaimed land are found to be definitely superior to those in other areas.

Rice-growing areas in India are coincident with endemic malarial tracts. There are several tracts in India which are very fertile but have remained mostly uncultivated because of the hyper-endemic malarial conditions. Such tracts are (*a*) a horizontal strip of sub-Himalayan tract—*terai*, (*b*) a vertical strip along the Western Ghats and (*c*) a strip along the Eastern Ghats enlarging into a wide belt at the top merging into Tamil Nadu, Orissa, Madhya Pradesh and Andhra. In all these areas, rice cultivation may be very profitable as the rainfall is between 50"-100" per year.

The whole of the country in the south between the Ghats and the sea-coast from Goa to Cannanore can also be developed to yield food crops. This region is known as *Malnad*. The chief characteristics of the region are the following: (*a*) the rainfall is invariably over 60 inches; (*b*) the area is full of evergreen forests; (*c*) the density of population is below the

average of 200 to 300 per square mile. The chief crops are paddy, betel nut, cardamom, pepper and coffee. In spite of the great geographical advantages of the Malnad area, it is at present in a backward position, because of excessive rainfall, unhealthy climate, prevalence of malaria, inadequacy of communication and scarcity of labour. If these problems are solved. Malnad will contribute substantially towards the production of foodgrains in the country. The use of tractors will enable the now ineccessible lands to be brought under cultivation.

There has been considerable increase in the consumption of chemical fertilisers in India. From 653,000 tonnes of chemical fertilisers which the farmers used in 1964-65, the volume increased to 2 million tonnes in 1970-71. Notwithstanding substantial increase in domestic production of chemical fertilisers, the rate of increase has been rather uneven as between different parts of the country. The Northern region has the highest rate of growth, while it is slow in the Western Zone. "Slow progress in the Western Zone can be explained in terms of poor irrigation facilities, while the lag in the eastern and Southern Zones must be partly explained by the preponderance of small holdings".

Not only there is to be more use of chemical fertilisers in India, but also its availability and distribution. The Fertiliser Corporation of India with its five units at Sindri (Bihar), Nangal (Punjab), Gorakhpur (U.P.), Trombay (Maharashtra) and Namrup (Assam) has, at present, production capacity of 400,000 tonnes of nitrogen and 36,000 tonnes of P 205. The production is still short of present demand, and there is a steep increase in the import of fertilisers. The FCI has programmes for expansion of existing units as well as for starting new ones at Durgapur (West Bengal), Barauni (Bihar), Ramagundam (Andhra Pradesh), Talcher (Orissa), and Korba (Madhya Pradesh). The units of the FCI and those in the private sector can through their production make the green revolution effective and solve the problems of food and agricultural raw materials.

The question of encouraging the use of subsidiary foods like bananas, tapioca and sweet potatoes, and also changing

food habits so as to be less dependent on traditional items has not been taken up seriously. Some time ago, the Government of India set up a *Subsidiary Food Production Committee*, which recommended increased production of sweet potatoes, tapioca, and the utilization of groundnut cakes. The use of non-cereal food can reduce the demand for cereals and also release land for the production of other foods.

Rice: It is at present the most important crop in India, covering as it does nearly 30 per cent of India's sown area. India is the second largest rice-producing country in the world.

Rice thrives best in high temperature and abundant moisture and the crop is generally grown in fields susceptible of being flooded at certain stages of its growth. Hence the largest areas under rice are found in river deltas, in low-lying coastal districts and in the tracts subject to floods during the monsoon.

There are three rice crops in the year, known as the *Aus* (autumn), *Aman* (winter) and *Boro* (summer) according to the season in which they are harvested. The winter crop, most important of all, is sown between June and August, and harvested between November and January. The autumn crop is sown in March-July and harvested in September-October. The summer crop is sown between November and January and harvested in March-May, Rice can also be grown in hill-tracts if the supply of water is abundant, and the summer, warm. "For the purposes of cultivation, the hill-sides are cut into terraces which are levelled off and embanked by means of bunds in order to retain the moisture obtained from nearby streams or from rainfall."

In Madhya Pradesh only one rice crop is cultivated. This is sown in May-June and harvested in September-November.

Rice is sown in India in three ways—by broadcaste, by drill and by transplantation from a seed-bed. The first method is practised where labour is scarce and the soil infertile. The second method is mostly confined to Peninsular India. The third method is common but it requires a plentiful supply of labour, because the seed-beds are to be highly manured before the seeds are sown. After four or five weeks, the seedlings are uprooted, tied into bundles and carried to the field where they are again planted by hand. The transplanting of the young plants from seed-beds to fields, cutting the rice with sickle and

the husking of the grain—all involve much manual labour.

The monsoon greatly influences rice production in India. Its failure has much adverse effect on the output, because water is the principal factor in its cultivation. Rice covers about 37 million hectares of land out of 121 million hectares under food-grains.

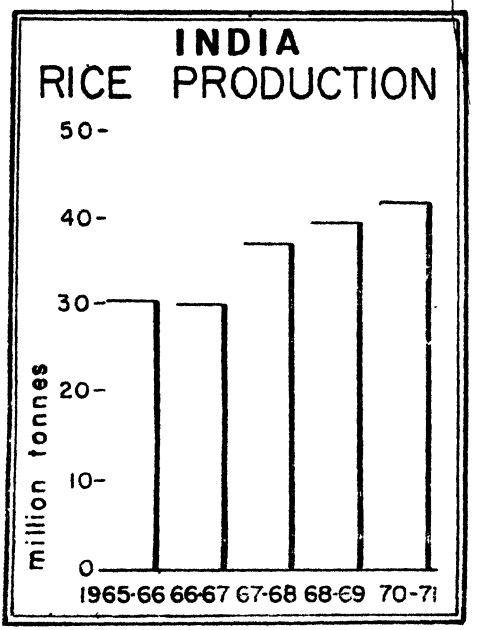


FIG. No. 79. India—Rice Production

The principal rice-growing areas of India are in order of importance. West Bengal, Andhra, Madhya Pradesh, Tamil Nadu, and Orissa. These areas account for about 80 p.c. of the total rice acreage in India. The other areas are Bihar, U.P., Maharashtra, Kerala, Mysore, Rajasthan, Punjab and Haryana. In 1970-71, the production of rice was 42.4 million tons as against 30 million tons in 1965-66.

The yield per acre of rice is influenced by a number of factors, such as rainfall, irrigation and soil, which are liable to vary from place to place. It also varies according to season. Summer rice generally gives the large[illegible] yield and autumn, the

smallest. West Bengal has the highest yield per hectare with 4850 lbs and the lowest in Madhya Pradesh with 2100 lbs. The average yield per hectare in India is 2,751 lbs.

RICE PRODUCTION (IN THOUSAND TONNES)

	1965-66	1967-68	1970-71
Andhra Pradesh	3,961	4,793	4,650
Assam	1,847	1,998	2,016
Bihar	4,262	4,728	4,539
Madhya Pradesh	1,700	3,301	3,647
Orissa	3,285	3,628	4,383
Tamil Nadu	3,709	4,291	5,303
U.P.	2,342	3,200	3,729
West Bengal	4,893	5,197	6,104
Mysore	1,159	1,849	1,953
Maharashtra	893	1,471	1,663
Kerala	998	1,105	1,271
All-India	30,655	37,858	42,448

Because of improved methods, and use of high yielding varieties of river, the yield per acre has gone up in Tamil Nadu, Andhra Pradesh, and Bihar in recent years. Since only a relatively small area is covered by high-yielding varieties in West Bengal, the production has not risen substantially there. The average yield per hectare in India still compares very unfavourably with those of U.S.A., Japan, Egypt and Italy where the yields are 9,060 lbs., 12,291 lbs., 9,000 lbs., and 12,728 lbs. respectively.

Almost in every district of West Bengal rice accounts for more than 60 per cent of the sown area. About 3 million hectares of land are under rice cultivation in West Bengal with approximately 6 million tons of rice as annual yield. Other areas where rice crop covers over 80 per cent of the sown area are Cuttack, Puri and Sambalpur in Orissa ; Kamrup and Goalpara in Assam and West Godavari, Chingleput, Tanjore and Kanara in the south-east.

Only about 30 per cent of the rice production is the marketable surplus, and the rest is consumed in the growing areas.

West Bengal has a normal deficit of half a million tons. Tamil Nadu, Bihar, Gujarat and U.P. have larger deficits but in these States, wheat is the staple food crop. Assam, Madhya Pradesh and Orissa normally have marketable surplus.

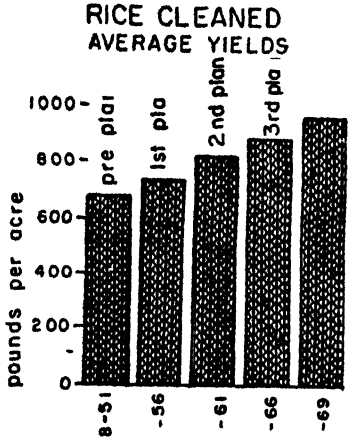


FIG. No. 80. Note the Gradual Increase in the Average Yield per Acre Plan Period-Wise.

There is a large scope for further cultivation of rice in India, particularly in West Bengal, Bihar and Orissa. The three multi-purpose projects in the Damodar, Koshi and Mahanadi aim at making millions of acres of land cultivable. Production of rice can be increased in the country by 50 per cent through improved varieties and better manuring.

Of late, active interest has been evinced by farmers in the rice cultivation of high yielding varieties. The chief features are : (1) use of less and better seed ; (2) sowing the seed in a raised "nursery" bed ; (3) transplanting the seedlings in rows to make weeding and fertilizing easy ; (4) use of chemical fertilizers. In Japan, where the fertility of land on which paddy is grown, is not very high, the farmers get twice or thrice as much as India's normal yields because of their following a system of cultivation which is highly systematic, and which involves the addition of adequate organic manures, application of fertilisers at proper times and at the proper stage of the growth of the crop, and the labour that the farmers put in by way of inter-culturing and weeding. In various States, both the indigenous and the new methods are in operation today. About 3 million hectares of land in India are under high yielding varieties.

The Japonica varieties are high-yielding, give a better percentage of rice to paddy and respond to intensive manuring. while Indica group germinates quicker and is resistant to

drought and diseases. The yield per hectare in 1968 under new varieties of seeds was 13,898 kgs compared to 2,056 under indigenous methods. It is estimated that if only 3 per cent of India's total irrigated paddy area is cultivated by this Japanese method, India need no longer import rice provided weather conditions remain favourable.

Wheat: Wheat is the staple food of the people in Punjab, Haryana, Rajasthan and Uttar Pradesh. Wheat requires a large amount of heat for its grain to ripen; but the necessary period of heat need not be very long as the grains ripen quickly. At the sowing season, wheat requires water but too heavy rain like that in West Bengal, Assam and eastern parts of Tamil Nadu is unfavourable to its cultivation. The plant can endure extreme dryness provided there is provision for minimum supply of water by rainfall or by means of irrigation. In Punjab and the Uttar Pradesh, where the rainfall never exceeds thirty inches per annum, wheat cultivation has become very successful with the help of irrigation.

In India there are two principal varieties of wheat: the *normal bread wheat* and the *macaroni wheat.* The first type grows as an irrigated crop in Punjab, Haryana and U.P. and thrives best on soils of the clayey type. The second type is grown as a rain-fed crop on the clayey black soil of Maharashtra, Madhya Pradesh and the western part of Andhra.

Wheat grows in two seasons—in winter and spring. The *winter wheat* requires low temperature in the early stages of growth and can stand winter cold to mature in summer months. The winter wheat, therefore, takes a long period to grow. The *spring wheat* is sown in April and harvested in August. In India, most of the wheat is grown in winter.

In Northern India, the bulk of the crop is generally sown by November, while in the Deccan and parts of Maharashtra State, the crop is sown between September and the middle of October.

Wheat in India takes 4 to 6 months to ripen as against nine to ten months in some western countries. In the south the growing period is shorter than in the north. The harvesting may begin at the end of December in the south, while in the north, harvesting is normally in full swing by the end of April.

In the hilly regions of northern India, the growing season for wheat is about nine months.

In 1971, wheat area covered 17 million hectares of land and produced 23 million tons of wheat. Since 1950, both in area under and production of wheat, there has been expansion. The large increase in 1971 came about on account of the use of high yielding varieties of wheat and fertilisers.

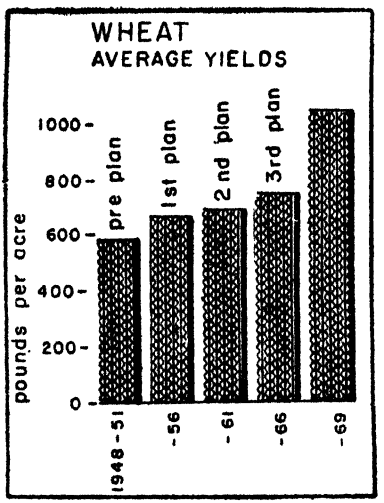


FIG. 81. Plan Period wise Increase in the Average Yield of Wheat per Acre.

The principal wheat growing areas are, in order of importance, U.P., Punjab, Bihar, Haryana, Madhya Pradesh and Rajasthan which together account for 90 to 95 p.c. of India's total. U.P. alone supplies one-third, followed by Punjab with 20 p.c.

Ploughing and sowing, harvesting and threshing provide scope for manual labour as well as for mechanisation. Wheat is cultivated in India in rotation with other crops like sugar cane, gram or cotton, depending on the amount of rainfall and soil. In the irrigated areas of Punjab, Haryana and northern U.P. wheat is often rotated with sugar cane and cotton. In Madhya

PRODUCTION OF WHEAT
(In million tons)

	1966	1968	1970-71
Bihar	0.3	1.3	1.1
Haryana	0.9	1.5	2.3
Madhya Pradesh	1.3	1.9	2.5
Punjab	1.9	3.4	4.8
Rajasthan	0.7	1.3	1.9
U.P.	3.7	5.8	7.5
All-India	10.3	16.5	23.2

Pradesh and Maharashtra groundnuts and linseeds are cultivated in rotation with wheat. "Where rainfall is high, the common practice is to grow wheat in one year, gram in the second year and a non-cereal crop in the third year." Thus, production of wheat is often fluctuated because of the rotation of crops in India. The average yield of wheat per acre has increased very much between the plan periods. It was 656 lbs. in 1955-56, about 680 lbs. in 1960-61, more than 740 lbs. in 1965-66 and 1013 lbs. in 1968-69. There is, however, wide variation between States.

Ordinarily, the difference in yield per acre is due to the condition of water supply. The areas which are served by irrigation produce the higher yield while the area which depends only on rainfall has a lower yield. In the Punjab, Haryana, western U.P. and Rajasthan, the cultivation of wheat depends on irrigation. It is a rain-fed crop in Bihar and the eastern part of U.P. At present, 3.5 million hectares of irrigated area are under wheat in the country.

In U.P. wheat is cultivated more or less throughout the State and the rich producing districts are Dehra-Dun, Shaharanpur, Muzaffarnagar, Meerut, Moradabad, Etawah, Shajahanpur, Badaun and Nainital, where more than 30 per cent of the area is under wheat. The basin of Narmada in Madhya Pradesh is also a rich wheat region. Although the monsoon discourages the wheat cultivation in West Bengal about 400,000 tons are raised annually in Murshidabad and parts of Nadia.

Nearly 45 per cent of Indian wheat is consumed in the growing areas and the remaining 55 per cent is put on the open market.

Vigorous efforts are being made to introduce newer varieties of wheat as extensively as possible to have higher yields. The Mexican varieties of wheat have already raised the yield to 210 maunds per hectare in 1970 instead of 45 maunds as it was in 1960. The scope for further increase in production of wheat is also great in Punjab and U.P. and if proper attempts are made, the country will raise 30 million tons of wheat a year from 1973.

Millets: Millet is a short season crop and is grown generally in Madras, Maharashtra and the adjoining districts of Andhra. It flourishes best in hot lands which are fairly dry. It

can be grown without irrigation even in areas where rainfall is scanty.

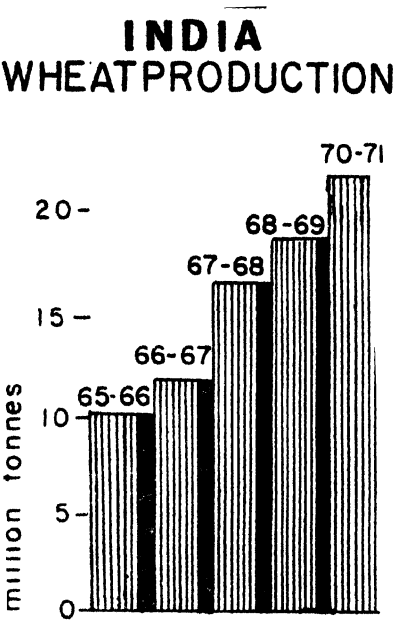


FIG. No. 82. India—Wheat Production

There are two varieties of millets in India—Jowar and Bajra.

Jowar

Jowar is extensively cultivated in the Deccan, and also to some extent in other dry parts of India. The area under cultivation is about 18 million acres and the yield is about 10 million tons. Maharashtra, M.P. and Andhra account for more than 60 per cent of the total acreage under jowar in India. Other areas are Rajasthan and Uttar Pradesh. In the Sholapur district of Maharashtra more than 60 per cent of the sown area is under jowar. In Poona and Belgaum (Maharashtra), the acreage under jowar accounts for more than 50 per cent of total area in each. Jowar is commonly called *Sorghum* in Europe and America. In

India, the product is of great importance both as food and as fodder. The average yield is about 1,800 lbs. per hectare.

Bajra : Bajra is a short season crop and is grown generally in poorer soils. It is less widely cultivated and is essentially a village food crop. Gujarat and Rajasthan are the principal producers. The other producers are Punjab, Tamil Nadu and Andhra Pradesh. The area under cultivation is about 12 million hectares and the yield amounts to about 5 million tons. The average yield is 1,250 lbs. per hectare. More than 50 p.c. of the acreage under bajra is confined to Gujarat, Rajasthan and U.P. In Bhavnagar (in Gujarat), bajra covers more than 60 per cent of the sown area.

One-fourth of the total production of millets is exported and the destinations are Sudan, Saudi Arabia, Netherlands, East Africa and Aden. More than 60 per cent of the millet is shipped from Bombay.

Barley : It is a winter crop in India and is sown in October and November. The harvesting season begins from the third week of March and is completed by the middle of April. Barley has a very short period of growth compared to wheat or gram.

One of the interesting features in the cultivation of barley in India is the fact that when the cultivators find the season to be unfavourable for wheat or gram, they take to barley as a cash crop. India raises nearly 5 per cent of the world's total barley. It is mainly grown in Northern India and the U.P. has the largest acreage. The Republic has an area of about 3 million hectares under barley with an average annual production of 3.5 million tons. In U.P. the crop is relatively important having about 9 per cent of the total cropped area under it. Its cultivation is very extensive in the Ganga basin of the U.P., particularly in the districts of Banaras, Jaunpur, Gazipur, Gorakhpur, Allahabad, Balia, Pratapgarh, Azamgarh and Garhwal. The south-eastern districts of Haryana are also important producers. Barley also covers a large percentage of the total sown area in Saran, Champaran and Muzaffarpur in Bihar. In Bihar, the area under barley is about 5 per cent of the total cropped area. Thus the two chief zones of barley production are (*a*) the north-western districts of Bihar and the adjoining north-eastern districts of U.P. and (*b*) Haryana and the adjacent districts of U.P.

The internal demand for barley is so high that exportable surplus has not attained considerable dimensions.

Maize: *Maize* is found more or less all over India, but Northern India raises the major portion. Most of the maize is grown in regions with an annual rainfall of at least 20 inches. The total area under maize is 6 million hectares with a production of about 6.2 million tonnes a year. The average yield of maize is 2,280 lbs. per hectare.

The U.P., Bihar, Haryana and Punjab are the leading producers. The other producers are Rajasthan and Madhya Pradesh. Maize cultivation is practised throughout U.P. and Bihar, although the Upper Ganga valley has a large acreage. North-Eastern Punjab and South-Western Kashmir are also rich producing areas.

The crop is raised mainly for consumption in the areas of production. India exports an insignificant quantity of maize, a little more than 200 tons. Exports are mainly from Bombay and Calcutta. Bombay alone sends more than 50 per cent.

In recent years certain industrial firms in India have developed the production of starch and glucose from maize.

Pulses: Pulses include food grains like gram, arhar, lentils or masur, etc., and are raised in different parts of India and consumed mostly in the areas of production. These grains are important both from the point of view of husbandry and of nutrition. Their nutrition value is great as a source of protein. Pulses constitute an important foodstuff not only for villagers but for animals as well. They are also grown as rotation crops to restore the fertility of the soil. The average yield went up from 963 lbs. per hectare in 1950 to 1620 lbs. in 1967. in 1970, a little more than 22 million hectares were under the cultivation of pulses with 12 million tons of production.

Gram is the most important pulse and is grown extensively in the Uttar Pradesh. Other producing areas are Punjab, Haryana, Madhya Pradesh, Maharashtra and Mysore. The annual output is nearly 6 million tons and the area is 8 m acres. Gram is often cultivated in combination with wheat.

The percentage of acreage is greater in Southern Uttar Pradesh (between Agra and Mirzapur). North-East Punjab,

Central Bihar, South Mysore and in North-Eastern part of Madhya Pradesh.

Lentil or *Mosur* is grown particularly in the Madhya Pradesh, Tamil Nadu and the Uttar Pradesh, though in other States its cultivation is not uncommon. *Arhar* is generally grown as a mixed crop, particularly in rotation with cereals. The exports of pulses are made to the U.K., Ceylon, Mauritius, Burma and France. Calcutta, Madras and Bombay participate in the export trade.

Tea : India is the largest tea-producing country in the world. The region of Indian tea-cultivation is a wide one. Beginning with the Himalayan plantations in the Punjab, it extends to the peninsular India in Kerala. Tea-plant requires a deep fertile soil, which must be exceptionally well-drained, so that there may not be stagnant water on it. It is, therefore, generally grown on hill-sides. High temperature is essential for tea-cultivation.

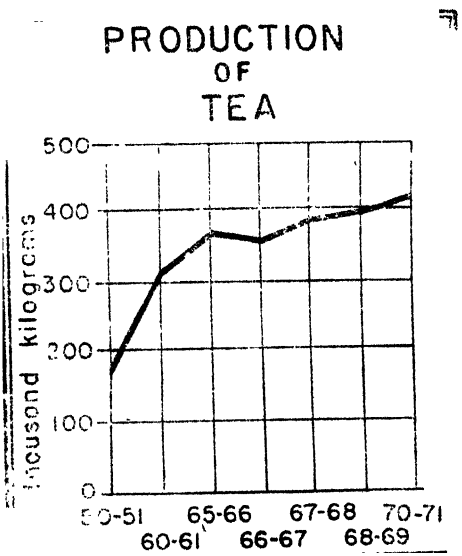


FIG. No. 83. Production of Tea.

There are two principal tea-producing regions in India, namely, North-East India and South India. North-East India includes the Assam valley, the Surma valley or Cachar, Dar-

jeeling, Dooars and Tarai and Tripura. Although Assam is surrounded on all sides by mountains, it is a level plain and has the largest concentration of tea in the world. Cachar is full of small hillocks. Darjeeling is a hill district and grows tea at a height of 1,000 ft. to 6,000 ft. Seventy-five per cent of Indian tea is obtained from Assam and West Bengal. The second tea-producing region is South India which is also an important tea-producer and contributes nearly 20 per cent of the Indian output.[6] The total area under tea cultivation in India is about 348,000 hectares, and this acreage has remained almost constant since 1950.

Tea production in India was 395,000 tonnes in 1969 compared to 275,000 tonnes in 1950. Thus the production has considerably increased in recent years by application of technology and liberal doses of inputs. Many tea gardens cannot have the optimum production because of the lack of fertility in the soil and the high transport charges.

The average yield per hectare is 2540 lbs. The higher yield is the result of the use of fertilisers and the timely pruning of plants. Though Tamil Nadu is not a large producer of tea, it has the highest yield per hectare with 3000 lbs per hectare.

The tea plantation industry provides direct employment to more than a million persons in the country.

Tea-cultivation has opened up many areas which were previously inaccessible jungles and forests. Tea as a plant also does not compete with other cash crops for land. It is interesting to note that the replacement of forests and jungles by tea has not led to soil erosion which is often the result of extensive denudation of forests for purposes of cultivation.

Assam contributes more than 50 per cent of the total Indian tea production. In the districts of Darrang, Sibsagar, Lakhimpur (in the Upper Brahmaputra valley) and in Cachar tea-plantations cover more than 30 per cent of the sown area. Arunachal Pradesh (previously known as NEFA) also grows a

[6] In 1971, Assam and West Bengal contributed 77 p.c. of India's tea production and the South accounted for the remaining 23 per cent.

large amount. These areas are served magnificently by railways and rivers.

Although West Bengal occupies the second position in the list of tea-producing areas, her tea-cultivation is not so extensive as that of Assam. The two adjoining districts of Darjeeling and Jalpaiguri produce almost the entire output of West Bengal. West Bengal's production varies between 20 and 25 per cent of the Union's total. Tripura raises a small quantity. Tea is also grown in Purnea, Ranchi and Hazaribagh in Bihar: Garhwal and Almora in the U.P., and Himachal Pradesh, Bihar, Uttar Pradesh and Punjab account for 5 per cent of the total area under tea. In Southern India, the major portion of the output is raised by Kerala and Tamil Nadu; the other areas are Maharashtra and Mysore. The tea-producing districts in Kerala are Central Travancore, Karan Devans and Wynad. In Tamil Nadu, the areas are Annamalais, Nilgiris and Nilgiris-Wynad.

Out of the world production in 1969 of 1.2 million metric tons, India's share was about one-third of the world's total. India's competitors are Ceylon (220,283), Japan (90,000), and Bangladesh (29,030). India once the greatest tea-exporting country in the world has now yielded place to Ceylon. India exports about 30 per cent of the world's trade in tea. Ceylon's share is 40 p.c.

The major markets for Indian tea are U.K., U.S.A., Canada, Irish Republic, Iraq, Australia, Netherlands, Western Germany and Turkey. The U.K. accounts for more than 58 per cent of India's tea exports every year and the prosperity of the tea industry depends to a very large extent on the demand for tea in the U.K. which is the largest consumer in the world. Of the total exports to U.K. from India, tea accounts for 40 p.c. in terms of value. In 1971, out of the total British imports from India £111 million, tea was for £37 million. Tea is a very important earner of foreign exchange, and second in rank to jute manufactures.[7]

[7] In 1969, India exported 169,000 metric tons of tea, out of the world's total tea trade of 509,000 tons. In the same year, India earned Rs. 166 crores (pre-devaluation rate) in foreign exchange.

Indian tea holds a strong position in a few selected markets. Taking an average of the last few years, India supplies nearly 60 per cent of the requirements of U.K., 90 per cent of the Irish Republic, 35 per cent of U.S.A., 45 per cent of Canada, and exports substantial quantities to U.A.R., Australia and Iran.

Since Indian tea has to compete in foreign market with that of Ceylon, Indonesia, Bangladesh, Japan and East African countries, the exchange earnings are not very steady. Nevertheless, the earnings are in the increase though at a slow rate.

The export quotas of tea are now regulated by the Licensing Committee of the Tea Board under the Tea Act, 1953. Normally, the Government authorises the Tea Board to allow export quota up to 65 per cent of the crop.

In order to meet the increasing demand for tea within the country and to promote exports of tea further, plans are being made to give high priority to tea-plantation for additional production each year by 175 million lbs.

The trend for India, Bangladesh and Ceylon is to consume more tea at home. On the other hand tea-drinking in the main importing countries has not increased appreciably.

The future of the tea industry is closely linked with the cost of production. India has to produce good quality tea at reasonable cost in order to face successfully the growing competition in the international market and also to develop the internal market. One of the problems of the Indian tea industry is the inadequate wagon allotments for bringing coal to the tea gardens. Coal requirements of tea estates in North Bengal come to about 150,000 tons, but hardly 60 to 70 p.c. are available in time. Still another problem is the congestion at Jalpaiguri railway station owing to limited transhipment capacity. India has also to intensify her marketing efforts in Europe and North America. With a direct steamer service between Calcutta and Persian Gulf ports, Indian tea can have more of the Middle East markets.

Coffee : The systematic cultivation of coffee in India was started from 1820 when a large plantation was opened in Mysore. Southern India has the monopoly of coffee cultivation in India.

The plantations are generally located between levels of 2,000 and 4,000 feet on hilly forest land. These areas are exposed to the summer monsoon. The optimum altitude and rainfall vary between districts: in North Mysore the best yields are obtained from estates at an altitude of about 4,000 feet with an annual rainfall of 50 inches, in North Coorg at 3,500 feet with a rainfall of 80 inches.

In India the plant is sown in the rainy season and the berries begin to ripen in October. Plucking and hand-picking of berries continue till January

Nearly 114,000 hectares of land are under coffee plantation and the average yield is 65,000 tons. In 1970-71, the production was 72,000 tons. There are two varieties of coffee—*Arabica* and *Robusta*—of which the former accounts for 75 p.c. of the coffee production in India. Arabica coffee is noted for its good quality; Robusta has better resistance to pests and diseases, yields more and is cheaper to produce.

Unlike tea, the importance of coffee is more for internal market than for export. There are about 12,800 coffee estates in India. Approximately 2,30,000 workers are employed. Though the number is small, from the point of view of South India's economy, it is highly significant inasmuch as two-thirds of the workers are full-time and have no other source of income. About 60 p.c. of the coffee production comes from Mysore, followed by Kerala.

In Mysore, the plantations are mostly confined to the south and west, particularly in the districts of Kadur, Shimoga, Hasan and Mysore. Mysore has the largest acreage under coffee plantation and the production is always over 60 per cent of India's total. In Tamil Nadu coffee plantations are found mostly in the south-west from North Arcot to Tinnevelley including the western areas. The Nilgiris is the most productive area of Tamil Nadu. In Coorg more than 20 per cent of the total acreage is under coffee. A little coffee is also grown in the Satara district of Maharashtra. There are vast underdeveloped areas in the States of Tamil Nadu and Mysore for the expansion of the coffee cultivation, since it requires three to five years for a plant to mature and gives yields for 30 years, the initial period of waiting does not readily encourage investment of funds. However, attempts are being made to grow coffee in new areas

like Araku valley in Andhra Pradesh, in parts of West Bengal, Assam and Andamans.

The average yield of coffee per hectare is 908 lbs. the highest being in Mysore with 1088 lbs. and lowest 353 lbs, in Tamil Nadu.

More than 60 per cent of the annual production of coffee is consumed in India. Coffee has already become a popular drink even in areas where till recently tea had its monopoly. Also, great efforts are being made to promote exports of Indian coffee. Indian coffee is exported to the U.K., France, Germany, Netherlands, Belgium, Australia and Iraq. U.K. is the largest buyer of Indian coffee and takes about one-third of the total coffee exported. Participating ports in the export trade are Mangalore, Tellicherry, Calicut and Madras (Mangalore 76 p.c., Tellicherry 11 p.c., Calicut 10 p.c., Madras 3 p.c.). The exports of Indian coffee are often affected by the competition of Brazilian coffee which today dominates the coffee market of the world. India exported 34,000 tons of coffee in 1969 and earned Rs. 260 million as foreign exchange from her export of coffee compared to Rs. 14 million in 1950.

The internal consumption is of the order of about 30,000 tons a year. Since the domestic market is expanding, and since export is also on the increase, the main problem is to maintain the growing internal market as well as to promote exports. The Indian Coffee Board which was constituted under the provisions of the Coffee Market Expansion Act, 1957, controls the marketing and export of coffee. All coffee grown in the country is required to be delivered into a pool maintained by the Coffee Board. Coffee is released for the internal market through public auctions and co-operative societies and exports are allowed only under Licences issued by the Board. The Board is also responsible for propaganda and publicity, agriculture and technological research and assistance to coffee estates for development. Propaganda in the U.K. and other parts of Europe is met by the levy of a customs duty at the rate of a rupee per cwt. on coffee exports and an excise duty at the same rate levied on coffee released for consumption in India.

India is a participant of the International Coffee Agreement of 1962 and has accepted the quota system of exports. According to this agreement, India can export upto 21,000 tons of

coffee to countries which are members of the agreement. India can also export beyond this quantity to other countries. Early in 1965, the International Coffee Council decided to adopt a semi-automatic system which linked annual export quotas directly to an average price. Whenever the price fell below average, the export quotas were subsequently reduced. Although India is not satisfied with her basic quota, she has not withdrawn from the agreement.

Tobacco: India is the second largest tobacco-producing country in the world and contributes about 8 per cent of the world's total. India, together with the U.S.A. and China, accounts for 60 per cent of the world's tobacco-growing areas. The area under tobacco in India is 398,000 hectares and production about 348,000 tons (1969).

Tobacco cultivation is geographically confined to two main zones—the Eastern Zone, comprising Bihar, U.P. and West Bengal and the Southern Zone, which comprises Tamil Nadu, Andhra, Mysore and Maharashtra.

There are two varieties of tobacco in India—*Nicotiana abucum* and *Nicotiana rustica,* of which the former is important for export and the manufacture of cigarettes and cigars in India. *Nicotiana 'rustica* is in demand for hookah, chewing and snuff. Though 90 p.c. of India's tobacco is *Nicotiana tabucum,* the top grade *Virginia* type accounts for only 15 p.c. For export, however, the Virginia type of *Nicotiana Tabucum* is in great demand. About 30 p.c. of the tobacco is used in making cigars and cheroots, 20 p.c. in bidi, 25 p.c. in cigarettes and the rest in chewing and for hookah.

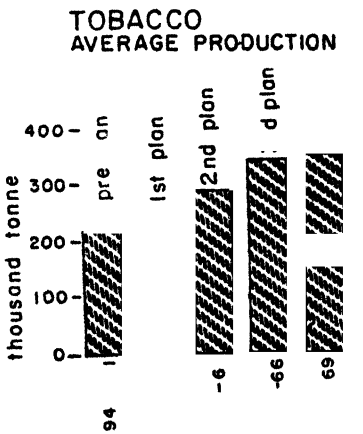


FIG. No. 84. Acreage & Production of Tobacco in India.

The Eastern Zone consisting of Bihar and West Bengal has under tobacco about 50,000 hectares and the production is about

like Araku valley in Andhra Pradesh, in parts of West Bengal, Assam and Andamans.

The average yield of coffee per hectare is 908 lbs. the highest being in Mysore with 1088 lbs. and lowest 353 lbs, in Tamil Nadu.

More than 60 per cent of the annual production of coffee is consumed in India. Coffee has already become a popular drink even in areas where till recently tea had its monopoly. Also, great efforts are being made to promote exports of Indian coffee. Indian coffee is exported to the U.K., France, Germany, Netherlands, Belgium, Australia and Iraq. U.K. is the largest buyer of Indian coffee and takes about one-third of the total coffee exported. Participating ports in the export trade are Mangalore, Tellicherry, Calicut and Madras (Mangalore 76 p.c., Tellicherry 11 p.c., Calicut 10 p.c., Madras 3 p.c.). The exports of Indian coffee are often affected by the competition of Brazilian coffee which today dominates the coffee market of the world. India exported 34,000 tons of coffee in 1969 and earned Rs. 260 million as foreign exchange from her export of coffee compared to Rs. 14 million in 1950.

The internal consumption is of the order of about 30,000 tons a year. Since the domestic market is expanding, and since export is also on the increase, the main problem is to maintain the growing internal market as well as to promote exports. The Indian Coffee Board which was constituted under the provisions of the Coffee Market Expansion Act, 1957, controls the marketing and export of coffee. All coffee grown in the country is required to be delivered into a pool maintained by the Coffee Board. Coffee is released for the internal market through public auctions and co-operative societies and exports are allowed only under Licences issued by the Board. The Board is also responsible for propaganda and publicity, agriculture and technological research and assistance to coffee estates for development. Propaganda in the U.K. and other parts of Europe is met by the levy of a customs duty at the rate of a rupee per cwt. on coffee exports and an excise duty at the same rate levied on coffee released for consumption in India.

India is a participant of the International Coffee Agreement of 1962 and has accepted the quota system of exports. According to this agreement, India can export upto 21,000 tons of

coffee to countries which are members of the agreement. India can also export beyond this quantity to other countries. Early in 1965, the International Coffee Council decided to adopt a semi-automatic system which linked annual export quotas directly to an average price. Whenever the price fell below average, the export quotas were subsequently reduced. Although India is not satisfied with her basic quota, she has not withdrawn from the agreement.

Tobacco: India is the second largest tobacco-producing country in the world and contributes about 8 per cent of the world's total. India, together with the U.S.A. and China, accounts for 60 per cent of the world's tobacco-growing areas. The area under tobacco in India is 398,000 hectares and production about 348,000 tons (1969).

Tobacco cultivation is geographically confined to two main zones—the Eastern Zone, comprising Bihar, U.P. and West Bengal and the Southern Zone, which comprises Tamil Nadu, Andhra, Mysore and Maharashtra.

There are two varieties of tobacco in India—*Nicotiana abucum* and *Nicotiana rustica,* of which the former is important for export and the manufacture of cigarettes and cigars in India. *Nicotiana 'rustica* is in demand for hookah, chewing and snuff. Though 90 p.c. of India's tobacco is *Nicotiana tabucum,* the top grade *Virginia* type accounts for only 15 p.c. For export, however, the Virginia type of *Nicotiana Tabucum* is in great demand. About 30 p.c. of the tobacco is used in making cigars and cheroots, 20 p.c. in bidi, 25 p.c. in cigarettes and the rest in chewing and for hookah.

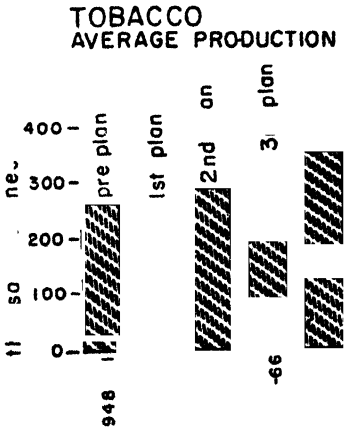


FIG. No. 84. Acreage & Production of Tobacco in India.

The Eastern Zone consisting of Bihar and West Bengal has under tobacco about 50,000 hectares and the production is about

20 p.c. of India's total. The districts of Muzaffarpur, Darbhanga, Monghyr and Purnea produce 90 per cent of Bihar tobacco. In West Bengal, tobacco tracts include Jalpaiguri and Cooch Behar; some quantities are also raised in Hooghly. West Bengal raises only cigar tobacco and hookah tobacco.

About 35 per cent of the production of raw tobacco in the country comes from Andhra Pradesh where the important tobacco-growing districts are Guntur, Visakhapatnam, East Godavari and Bidar. Two-thirds of the total acreage are confined to Guntur. Andhra Pradesh is noted for cigarette Virginia, cigar tobacco, cheroot tobacco, chewing tobacco and snuff. The varieties grown in Dindigul, Madurai, Tiruchirapalli and Coimbatore in Tamil Nadu are used for cheroots and cigars.

Outside these two zones, tobacco is cultivated in Punjab, particularly in the districts of Jullundhur, Hasiarpur and Gurdaspur, and in Gujarat.

One of the serious problems of Indian tobacco is that a very large proportion is not suited to standardised tobacco products. The leaf produced in India is generally of coarse, heavy type, with a dark colour and a strong flavour and, as such, it is not very suitable for cigarette-marking. Indian leaf makes an excellent filler. The loose cotton soil combined with the moist climate of Guntur, Krishna, East and West Godavari districts produces the best type of Virgina tobacco. These districts alone yield 95 per cent of India's cigarette tobacco. Guntur is the chief market.

Although India is the second largest tobacco-producing country in the world, her share in the world's export trade of tobacco is hardly 10 per cent. Virginia tobacco produced in the Andhra State forms the bulk of tobacco exports from India. The Tobacco Export Promotion Council has been set up in order to promote, sustain and explore new markets for Indian tobacco. The important markets are U.K., Japan, Aden, U.S.S.R., Ceylon, Egypt, Hongkong, Indonesia and Netherlands. In the U.K. and other continental countries, the Indian flue-cured Virginia tobacco has a demand in the cigarette manufacturing industry. As the exports are confined to high grade tobacco, there are plans to increase the output of superior grade from 15 p.c. to 25 p.c.

India earned Rs. 44 crores from export of tobacco in 1969-70.

About ninety per cent of the export are handled by Madras, the share of Bombay being 6 p.c. and of Calcutta, hardly 3 p.c. The U.K. has always been the chief market for Indian tobacco. One of the steps taken by Government to maintain the upward trend of Indian tobacco exports is to include tobacco in bilateral trade agreements.

The Government of India has constituted the Indian Central Tobacco Committee to assist in the improvement and development of production and marketing of tobacco. The Committee has established a Cenral Institute at Rajahmundry (Andhra) for research on cigarette, and regional experimental stations in Tamil Nadu, Bihar and West Bengal. If proper attempts are made, India can create markets in the Middle East, West Germany and U.S.S.R. for her tobacco.

Sugar-Cane : India has approximately 37 per cent of the world's sugar-cane area. Although sugar-cane is cultivated throughout India, the most important sugar-cane tracts are in U.P., Bihar, West Bengal, Punjab, Haryana and Maharashtra In fact, Northern India has a preponderant interest in the crop, producing as it does about 70 p.c. of the total production. From the point of view of climate, Peninsular India is ideal for sugar cane cultivation The average yield per hectare is 7,650 lbs., and the highest yields are in Andhra Pradesh, Maharashtra, Tamil Nadu and Mysore, each with more than 12,000 lbs. In Northern India, the highest yield comes from Orissa with 8,500 lbs.

There is an additional advantage in the fact that the crushing period of sugar-cane in the south is almost twice as long as that of upcountry plantation. But there are problems which stand in the way of greater expansion of sugar-cane cultivation in the Deccan. As the soils are not so rich as in U.P., the sugar cultivation is confined to canal areas. The units of sugar-cane crops are small and scattered along the canals. Besides, as canal water is also required for the cultivation of food crops, extensive sugar-cane cultivation is not possible. Thus geographically in the matter of sugar-cane cultivation Uttar Pradesh and Bihar still remain the chief suppliers of sugar-cane. In 1969, the total

area under sugar-cane in India was 2 million hectares and the production was 13 million tonnes in terms of gur.

Approximately 55 p.c. of the total sugar-cane production in India is utilised for the manufacture of *gur* and *khandsari*. Only 25 p.c. of cane goes to the mills for the manufacture of crystal sugar.

Uttar Pradesh produces about 45 per cent of India's total output. The plant is cultivated throughout the State and a very high area is devoted to it in Saharanpur, Shajahanpur, Fyzabad, Gorakhpur, Azamgarh, Ballia, Jaunpur, Banaras and Bulandshahr. In each of these districts, sugar-cane cultivation is carried on in small units on an extensive scale so that a factory can always get sufficient sugar-cane within a limited area to avoid cost in transport. In Bihar, the important districts are Champaran, Saran, Darbhanga and Muzaffarpur.

Maharashtra occupies the second position as a producer of sugar-cane and raises a little more than 12 per cent of India's total. Punjab and Haryana together have a production of 20 per cent of that of U·P. and cultivate cane extensively in Amritsar, Jullandhar and Rohtak.

In West Bengal, the producing districts are Birbhum, Burdwan and Nadia. About 23,000 hectares of land are under sugar-cane in West Bengal. The quantity of sugar-cane, however, is poor.

The yield of sugar-cane per hectare in India is the lowest in the world. In 1969, the average yield of sugar-cane per hectare in India was 48,600 kg compared to 229,900 kg in Hawaii, 76,100 kg in Australia and 71,900 kg in Mauritius.

Lack of fertilizers, poor varieties of cane, small and scattered nature of the holdings and backward methods of cultivation retard progress towards increased yields in India. Sugar-cane is planted in India in February and the harvest begins in November. Thus sugar-cane remains in the ground for 9 months compared with 14 months in Java. Consequently the sugar content in a cane in India is comparatively low. As the bulk of sugar-cane area is in Northern India with its extremes of temperature in summer and winter, the growing period is also short. The sugar-cane depends for its successful cultivation largely on

richness of soil. Each harvest of sugar-cane exhausts the soil of the plant nutrient to a great extent.

The average yield would have gone down further, had it not been for the development schemes under Plan periods. Sugarcane cannot be cheaper unless the country produces more of it by increasing the *yield per hectare* and not by increasing the area of cultivation. The low yield in India is also due to small holdings of the cultivators. Where the farms are comparatively large as in the Deccan, the yield is considerably high. It should also be possible to increase the yield per hectare with the introduction of better varieties. Even if an increase in the yield by 25 p.c. can be achieved, the availability of cane will be increased by 20 million tons. Mere increase, however, in the average yield will not help the sugar industry much unless at the same time the sucrose content in the cane is made higher.

Although sugar-cane is a quality product, its price in India is determined by the weight and not by quality of sugar content. The cultivators therefore feel encouraged to produce higher cane yields which actually result in lower sugar yields.

Recently, improved varieties of sugar-cane have been introduced in different areas to replace the low-yielding indigenous varieties. It is also possible to introduce in India the methods of cultivation adopted in Java with suitable modifications to suit local conditions. Already a good amount of research work is being carried on in the various sugar-cane centres of India. The improvement of sugar-cane cultivation and the control of its pests and diseases are being studied by the Indian Central Sugar-cane Committee.

Jute : Jute is the most important bast fibre of India and is an object of world commerce. The demand for jute in the world's markets is based upon the fact that it is the cheapest fibre for bagging agricultural produce. The cultivation of the plant is restricted mainly to the Ganges-Brahmaputra delta in West Bengal and Assam and in Bihar and Orissa, where the soil is enriched by alluvial deposits brought by river inundation favouring the growth of this exhausting crop without any expenditure on manure. Jute is sown from March to May and it grows to a height of ten to twelve feet. The harvesting period begins in July and extends to September.

In West Bengal, sowing is done in April and May, and harvesting time is mid-August to September. In Bihar and Assam, the time of sowing is March to April while in Orissa, it is May-June. The fibre from the stem is separated after the plant is

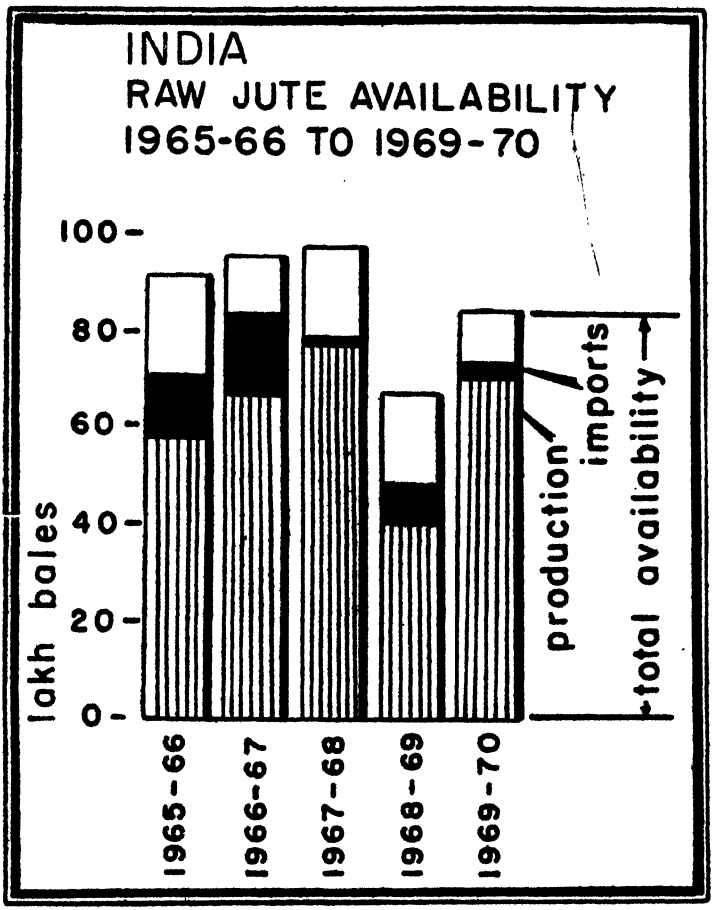


FIG. No. 85. Acreage and Production of Jute in India.

retted in a pool of stagnant water for 20 to 25 days according to the nature of the water. Though the usual practice is to do the retting in tanks and roadside stagnant pools, in some districts the plant is submerged in rivers also.

India has 885,000 hectares of land under jute cultivation and 320,000 hectares under *mesta*. Production in 1970 was 890,000 tons jute and 239,000 tons mesta. From the point of view of acreage and production, West Bengal occupies the first place, followed by Assam, Bihar, Orissa, Uttar Pradesh and Tripura. West Bengal raises about 50 per cent of India's total raw jute production. The production is also on the increase in Bihar and Assam. The soil and climate of Assam are highly favourable for the cultivation of jute specially in the districts of Goalpara, Kamrup, Nowgong and Tezpur. The area in Assam can be further increased by at least 50 p.c. though the present problem is the scarcity of skilled cultivators for jute production. U.P. has 12,000 hectares of land under jute in the submontane tracts along the foot of the Himalayas which are fed by the rivers Sarju and Gogra. These areas remain water-logged for about 5-6 months in a year and are therefore very fertile for jute cultivation. Maharashtra State can contribute substantially towards jute production as it has indigenous jute in certain coastal districts whose quality is in no way inferior to that of Bengal jute. The problem is whether Maharashtra jute can be made available at prices equitable to the growers and reasonable to the manufacturers.

In Orissa both acreage and production have increased considerably during the last 4 or 5 years. The plant is cultivated extensively in the Cuttack district.

The average yield of jute per hectare in India is 1,400 lbs. The yield of jute varies from State to State. The use of improved seeds, suitable fertilizers and better plant protection measures can raise the yield of jute by 50 to 100 per cent. The Agricultural Research Institute has introduced a new system of cultivation, as a result of which, not only has the *cost of cultivation been lowered, but the yield and quality have also improved considerably.* Jute is usually sown broadcast, and when the seedlings grow they are thinned out to ensure a rich Crop. This system of cultivation involves wastage of seed and requires hand labour at the time of weeding. Under the new plan, jute is sown in lines, and not broadcast and the seeds are grown three to four inches apart in furrows drawn at intervals of one foot. In line-sown jute all subsequent operations, such as

periodical weeding between the beds, are done by means of wheel hoes.

The normal requirements of raw jute by Indian mills are at about 68 lakh bales as against the present supply of 60 lakh bales of raw jute. The demand will further increase. The Fourth Five Year Plan has set a target of additional production of 2.8 million bales which will mean 45 p.c. increase over the base level in 1966 with 6.2 million bales. India has to import, however, a small quantity of special variety of raw jute —about 7 p.c. of the total supplies—from Bangladesh.

Mesta: Because of the shortage of jute fibre after the partition, the development of *Mesta* fibre received great impetus in India. The crop is known in the different parts of India by different names such as *Ambadi* in Maharashtra, *Bimli* in Andhra, *Deccan hemp* in Hyderabad, *Pusa hemp* in Bihar and *Mesta* in Bengal.

Mesta can also thrive in areas which are not quite suitable for jute crop. Like jute, it grows to a height of 8 to 12 feet and is retted to separate the fibre. Although *Mesta* is inferior to jute in respect of strength and fineness, it is being used with jute in India for the production of hessian and gunnies. In fact, this usefulness of *mesta* has made the position of the Indian jute mill industry almost independent of foreign sources of raw jute. Of the total production of 239,000 tons of mesta in 1970, West Bengal produced about 68 p.c. followed by Andhra Pradesh (13 p.c.) and Maharashtra (12 p.c.).

The production of and area under *Mesta* in West Bengal —the home of jute mill industry, has increased tremendously. Andhra's production is hardly three-fifths of that of West Bengal. The increased production of *Mesta* in West Bengal is due to higher yield per hectare, which is 3,000 lbs compared to 2,300 lbs in Andhra Pradesh, 2,000 lbs. in Bihar and 1,200 lbs in Maharashtra.

Mesta is also produced in Assam, Madhya Pradesh, Mysore, Orissa and Tamil Nadu.

Cotton

India is the second largest cotton-producing country in the world in respect of area, being preceded by the United States

of America only. In spite of the fact that she occupies the second position, her share in the world-production is less than 10 per cent. Cotton holds the first place among the commercial crops of India. From the national point of view, cotton as raw material for the Indian textile industry, provides factory employment for about 700,000 persons, contributes annually to the Government a substantial revenue from export duty and excise duty and earns valuable foreign exchange from its export. The area under cotton has gone up from 5.8 million hectares in 1952 to about 8 million hectares in 1969-70. Production, too, during this period has increased from 3 million bales to 5.23 million bales. Climatic conditions at the time of sowing influence the actual output in a year.

Gujarat, Maharashtra, Haryana and Punjab account for three-fifths of India's total production of raw cotton, each with more than a million bales. About half-a-million bale is raised in each State of Madhya Pradesh, Mysore and Tamil Nadu.

India grows a large variety of cotton over a wide range of climatic, soil and seasonal conditions, from the sub-montane tract in the extreme north of the Punjab to the Tinnevelly district of Tamil Nadu in the extreme south of India. Generally speaking, it is a dry-region crop and flourishes where the rainfall is less than 40 inches. The soil is equally important. The sticky black soil of the Deccan is ideal for cotton cultivation. Cotton is cultivated in Maharashtra and Gujarat, western part of Andhra, Tamil Nadu, Madhya Pradesh and parts of Rajasthan.

In India, cotton is considered long-staple when the fibre is 7″/8″ and above. When the fibre is below 7/8 inch and above 11/16 inch, it is medium staple. The fibre which is 11/16 inch and below is short staple.

For long, India was noted for the production of short staple cotton. Thirty years ago short staple cotton accounted for 58 p.c. of the total production as against 13 p.c. of long staple and 29 p.c. of medium staple cotton. Since then, more and more areas were put under improved varieties of cotton. The production of long staple and medium staple cotton has considerably increased and that of short staple has remained constant. In 1969, the long-staple cotton supplied 55 p.c., medium

staple 35 p.c. and short staple 10 p.c. of India's total cotton production.

Short staple cotton is in demand in foreign countries for mixing with wool. Assam, Manipur and Tripura can grow short staple cotton. The areas of long staple cotton are Maharashtra, Tamil Nadu, Haryana, Punjab, Madhya Pradesh and Western Andhra. Medium staple cotton is largely grown, besides the areas where long staple is available, in Rajasthan, Mysore and Uttar Pradesh.

The average yield of cotton per hectare in India is presently 300 lbs. compared to 1,260 lbs. in Egypt, 1,200 lbs. in Peru, 900 lbs. in Mexico, 1,260 lbs. in U.S.A. and 360 lbs. in Pakistan. Thus it compares very unfavourably with those in other cotton producing countries of the world. The average yield of cotton varies from State to State. Generally speaking, the yield per acre is higher in the irrigation areas than in rain-fed areas. Punjab gets 600 lbs. of raw cotton per hectare.

The Central Cotton Committee is engaged in improving cotton cultivation in India. The Committee raises a cess of two annas a bale on all cotton produced in India to meet its necessary expenses.

Because of the progress of production of long and medium staple varieties, India is now less dependent on foreign cotton.

The imports are now mainly confined to certain varieties of long staple cotton that cannot be produced in the country. The principal sources of foreign cotton are U.S.A., Kenya, Egypt, Tanganyika and Sudan. About 80 per cent comes from the U.S.A. and Egypt in almost equal proportions. In 1969-70, India imported 12 p.c. of the total requirement for cotton.

The need for increase in the cultivation and production of cotton in the country is indeed great. There is considerable scope for cotton cultivation in Rajasthan, Maharashtra and Madhya Pradesh. Irrigation facilities for cotton cultivation are available to the cotton growing areas of Punjab, Gujarat and Andhra Pradesh as a result of the various irrigation projects. Suitable schemes for the multiplication and distribution of improved varieties of cotton have also been taken up in the important cotton growing States.

Oil-seeds: India is one of the leading oil-seed producing countries of the world. With the exception of palm kernels, olives and soya beans, she raises all the principal oil-seeds for world trade. For many years, oil-seeds formed a big item in India's export trade. In recent years, however, such exports have declined as a deliberate policy to encourage their utilisation within the country for cooking and industrial purposes and to export oils and oilcakes.

Groundnut, castor seed, sesamum, rape-seed and linseed occupy about 14 million hectares of land, and the production exceeds 8 million tons annually.

The need for increasing the production of oil-seeds is being felt, and efforts are on to grow them on lands which are not usually suitable for food crops or in off seasons. Thus, in Maharashtra and Uttar Pradesh it is possible to grow the early variety of groundnuts before the *rabi crops*. In Tamil Nadu groundnuts and tilseeds can be cultivated immediately after the paddy crops. In Mysore, an increase in the production of groundnuts is likely in the cotton belts. There are also great possibilities of extending groundnut cultivation in the Punjab.

At present, the demand for oil-seeds arises mostly for making oils and fats (edible oil). More and more non-edible seeds like mohwa, neem, karanga and castor are utilised for industrial purposes to relieve the demand on edible seeds for similar purposes. It may be possible to get oil out of sal-seeds in Orissa.

Linseed: India is the second largest linseed-producing country in the world. Although it is one of the oldest fibre plants of India, linseed is cultivated for its seeds only. The plant requires the same kind of land as wheat and is grown as soon as the monsoon is over. The harvesting begins in February.

Linseed is mainly a rain-fed crop. The average rainfall between 300 and 70 inches per annum is best for its cultivation. The crop remains on the fields for five months. Linseed is cultivated in Madhya Pradesh, Bihar, Orissa, Uttar Pradesh, Maharashtra and West Bengal. It is also cultivated in Andhra, south-west Rajasthan, and Punjab. About 1.6 million hectares of land are under linseed cultivation and the production is

398,000 tons. Madhya Pradesh has about one-third of India's linseed area and produces more than one-third of India's total. Although U.P. has one-sixth of India's total area under linseed, her production is very close to Madhya Pradesh.

The average yield of linseed per hectare is highest in U.P. The yield in U.P. is 850 lbs. of linseed per hectare compared to 200 lbs. in Madhya Pradesh. Maharashtra raises 16 to 20 p.c. of linseed in the country, and her yield is 604 lbs. Rajasthan has also a high yield with 650 lbs. and her production is normally a little less than 45,000 tons a year.

India can export a little quantity of linseed and its oil. The formidable competitors of India in the world markets of linseed are Argentina, Canada, and Uruguay.

The United Kingdom, France, Belgium, Italy and Netherlands are buyers of Indian linseed and linseed oils.

Bombay handles two-thirds of the total exports of linseed.

Mustard and Rape-seed, the Indian name of which is *Sarson,* is grown with wheat. India raised about 30 p.c. of the total world production of rape seed and mustard seed. Almost the entire production is consumed within the country. It is a rabi crop, and sowing begins in August. The duration of the crop is 4 to 5 months. Its cultivation is restricted to the northern part of India, and the principal areas are Uttar Pradesh, Rajasthan, Madhya Pradesh and Punjab. Uttar Pradesh alone supplies more than 60 per cent of India's total. India had 3 million hectares under mustard-rape seed with 1.4 million tons in production. About 90 p.c. of the entire production of seed in India is used for the extraction of oil in India.

Groundnut: India is the largest groundnut-producing country in the world followed by West Africa, China, U.S.A. and Indonesia. Groundnut is essentially a tropical product and as such is grown extensively in Peninsular India. It is a kharif crop and is sown in May-August and harvested in November-January. India has a little more than 7.5 million hectares under groundnuts and the production is 5.8 million tons. Maharashtra accounts for about 25 p.c. of India's production and acreage. Andhra Pradesh in about 20 p.c. of India's total acreage raises 25 p.c. of India's production. The third largest

producer is Tamil Nadu which has the highest yield per hectare. India's average yield of groundnut per hectare is 2,000 lbs., and the relative productions of Maharashtra, Andhra Pradesh, and Tamil Nadu are 1,545 lbs., 2,189 lbs. and 3,063 lbs. respectively. Of late Mysore has become an important producer of groundnuts. Although U.P. has the second highest yield per acre, her production is hardly 3 p.c. of India's total.

Sesamum: India is the largest sesame-producing country in the world. The area under sesamum cultivation is 2.6 million hectares with about 430,000 tonnes. Madhya Pradesh is the leading producer closely followed by Rajasthan. Though Uttar Pradesh has the largest area under sesame cultivation, its production is lower than that of Madhya Pradesh and Rajasthan. The comparatively low yield in Uttar Pradesh is due to its climatic conditions.

It is both a rabi and kharif crop. As a rabi crop its duration is 5 months and as a kharif for 3 months. The plant is grown on light and sandy soils, although some of the varieties in India do well on the black cotton lands. The highest yield per hectare with 560 lbs. is raised in Assam which has only 5,000 hectares of land under sesamum cultivation.

There is little export of sesame seed from India.

Castor seed: India held a virtual monopoly in the production of castor seed for many years, but its cultivation has extended now to China, Indo-China, Brazil, Ecuador, Paraguay and Kenya.

The castor plant requires warm climate with a fair amount of moisture and rainfall after sowing. It grows well on land where maize is cultivated. The plant reaches a height of 20 to 30 feet.

It is cultivated chiefly in Maharashtra, Gujarat and Andhra Pradesh. A little above 390,000 hectares of land is under castor plants in India with 107,000 tonnes in production. More than 50 p.c. of the production comes from Andhra Pradesh.

Export of castor oil is considerable, and the principal buyers are the United Kingdom, France, the United States of America, Belgium, Italy, West Germany, and Canada. India exports about 12,000 tons of castor oil.

The U.K. takes about 50 per cent of the castor oil exported, followed by U.S.A. with about 20 per cent.

Coconut: Coconut is a very important source of vegetable oil. The tree is widely grown in islands and near the sea-sides of tropical lands. High temperature and heavy rainfall on alluvial lands are the ideal conditions for its growth. The tree takes 5 to 10 years to mature after which it continues bearing fruit for about 80 years. The chief products of the coconut are copra and coir fibre.

Copra is the commercial name for the kernel of the coconut, broken into small pieces and dried in the sun. The kernel of the coconut contains oil, which is an important article of commerce. This oil is edible and used for cooking purposes and for the manufacture of margarine and other butter substitutes.

India is the second largest coconut growing country in the world. There are 900,000 hectares of land under coconut cultivation in India. The production is about 519 crores of nuts a year. Kerala supplies more than 75 p.c. of the production. Andhra, Tamil Nadu, Mysore, Maharashtra, Gujarat, Orissa and West Bengal are the other producers. In the south, three-fourths of the area under coconut are in the districts of Malabar and South Kanara and East Godavari. In Kerala State, the coconut tracts are found in the lowlands and the middle area. It also raises the tree in some quantities on a narrow strip of sandy tract on the western sea-board. The biggest coconut areas of Mysore State are found in Tankur district followed by Hassan, Mysore, Chitradurg and Kadur. In Orissa, the main concentration of coconut tracts is in the districts of Puri and Cuttack. The two districts of Ratnagiri and Kolhapur contain nine-tenths of the coconut area of Maharashtra.

The coconuts are important in India for a variety of purposes. Tender nuts are in demand for the milky fluid inside, which provides a refreshing drink. Mature nuts are used mainly for four purposes: (*i*) for making copra, (*ii*) for religious offerings, (*iii*) for edible purposes as fresh kernel, and (*iv*) for raising seedlings.

About 45 per cent of India's production of mature nuts is utilised for making copra, while an equal quantity is used for edible purposes such as curries, chutneys, sweets, puddings etc. There is practically no export of coconut oil.

Cotton seed: The importance of cotton seed as a source of oil was not fully appreciated till late in the 19th century. The oil is used in cooking, in pharmacy, in the preparation of lard and margarine, and as a substitute for olive oil. Maharashtra, Punjab, Haryana, Madhya Pradesh, Andhra and Tamil Nadu are the chief producers.

Other seeds raised in India include poppy seed, mowra seed and niger seed.

Natural Rubber

Plantation of rubber which is of recent growth is carried on in Tamil Nadu, Mysore and Kerala. Both in respect of area and production, Kerala controls more than 96 per cent. The average yield per hectare is about 1200 lbs of raw rubber with Kerala at 1300 and Mysore at 600 lbs. The Indian Union produced about 76,500 tonnes of rubber in 1969. Although rubber makes only a small contribution to the economy of India, it made the country fifth in order of importance among the natural rubber producers in 1969. Of the Indian production, not more than 50 per cent is first grade rubber, the rest being lower grades. Rubber is mainly grown in the southern part of India.

In Southern India, communications are well-developed, and there is never any scarcity of labour in the plantations. The plantation employs a labour force of over 150,000 persons.

The domestic consumption of rubber has increased rapidly in recent years and is now estimated at 99,000 tons of which 75,000 tonnes are accounted for by natural rubber. To meet the increasing internal demand for rubber, the Government has a plan to bring 400 hectares of land under high yielding rubber. Even though efforts to produce more natural rubber becomes successful, there is urgent need for the production of synthetic rubber to meet the increasing demand for rubber. The inherent physical and chemical properties of synthetic rubber make it

much superior to natural rubber in many applications. Besides, the new areas which will be brought under plantation will not give yield before 6 or 7 years.

One of the problems of rubber plantation is the scarcity of suitable lands in view of the fact that its location is decided primarily by climatic and soil characteristics. Moreover, many areas which were, not long ago, used for rubber plantations, are now being cultivated for other crops.

It is possible to increase the yield of rubber per hectare from 1200 lbs. to 3000 lbs. India's geographical location and the fact that there are no other advanced manufacturing countries nearby, can make India a leading rubber goods exporter to Middle East, Africa and South-East Asian countries. However, the problem is to have a stable price of rubber so that adequate replanting and large scale new planting are made possible. A subsidy is given to all uneconomic areas to replant with high yielding plants. The Rubber Board has been set up to help the development of rubber plantation in the country.

6. Irrigation Works and Multipurpose Projects

As India is essentially an agricultural country, the need for a sufficient supply of water is always great. The *Monsoon* is the main source of water to Indian agriculture; but there are certain drawbacks in the character of the monsoon. These are:

(*i*) undependable rainfall as in Rajasthan and many parts of Punjab and Haryana.

(*ii*) uneven distribution: About 30 per cent of the total area receives rainfall between 0″—30″; more than 75″ rainfall is received by only about 10 per cent of the total area; 60 per cent of the total area has rainfall between 30″—75″.

(*iii*) absence of winter rain: Cultivation in winter requires artificial water-supply in the absence of winter rain.

(*iv*) the rainfall in about 70 p.c. of the crop area is too low to permit intensive cultivation even during the main crop season.

Because of its dependence on rainfall, which is undependable, Indian agriculture is often described as "a gamble in the monsoon." Since eighty per cent of the annual rainfall in India is received in less than four months, the need for adequate water-supply for crops on a year-round basis is very urgent. Man is unable to control rainfall in which either deficiency, irregularity or super-abundance may give rise to disastrous famines. He can, however, provide measures which may reduce famines. The chief among these is the extension of irrigation. Irrigation means supply of water to the fields by means of canals from rivers or from storage tanks for the purpose of agriculture. Of the available river water resources of the country, only about 30 per cent of the usable flow or 9 per cent of the total annual flow is utilised. Ground water can be utilised for irrigating areas which cannot be irrigated economically by canals or which are susceptible to water-logging. Broadly, the Indo-Gangetic basin, the Sabarmati basin and coastal areas in Tamil Nadu and Andhra Pradesh have great scope for ground water development.

Inadequate rainfall is only one factor that is taken into consideration for developing irrigation facilities. Unless certain essential ingredients like ample sunshine and fertile soil are already present, irrigation can never be successful. The poor quality of soil in many parts of India has been responsible for the failure of some irrigation projects. Irrigation cannot turn bad soil into good. However, the use of chemical fertilisers is making this dependence on soil less unavoidable. Also, land should be easily cultivable and water cheaply applied. Irrigation is necessary in all parts of the country where the mean annual rainfall is less than 50 inches. This applies to Rajasthan where the rainfall is less than five inches in a year, to Uttar Pradesh, parts of Madhya Pradesh, Bihar, Punjab, Haryana, Orissa and over the whole of the Deccan Plateau, except a range along the western coast.

The area irrigated in Indian Union is about 27 million hectares of which major and medium irrigation accounts for 12 million hectares. This is the largest area which is irrigated in any country of the world. The Fourth Plan target is to have additional 9 million acres through major irrigation and 17 million acres through minor irrigation.

The sources of irrigation are canals, tanks and wells.

(*i*) WELLS : In areas where stream flow is seasonal and where storage from reservoirs is not feasible, wells are considered as a source of water-supply. About 6 million hectares of area in India are irrigated by means of wells. The construction and maintenance of wells have been mainly the result of private enterprise. Water is raised from wells either by manual labour, bullocks, water-lifts, the Persian wheels or by means of oil engines. Well-irrigation is extensively used in Uttar Pradesh Punjab, Tamil Nadu, Maharashtra, Rajasthan and Madhya Pradesh, and irrigates 8 million hectares. One of the disadvantages of irrigation by wells is that the water has no fertilising property in itself unlike the canal water which carries large quantities of fertilising silt to the fields irrigated. It is therefore necessary to use manure on soil irrigated by wells. The Government of India and the State Governments are now supplying manures, both organic and artificial, for securing maximum yield of crops from the fields irrigated by wells. The *tube-wells* are recent growths for purposes of irrigation. At present the U.P. and Bihar are the two States where tube-well irrigation has been introduced. The tube-well can be expanded greatly in Punjab, Haryana, West Bengal, Tamil Nadu, Andhra Pradesh and parts of Maharashtra, which have a relatively sure supply of ground water. Besides, these areas have potential for 2 or 3 crops per year. An average tube-well with a 6″ diameter tube can supply 33,000 gallons of water and irrigate about 150 hectares of land.

For successful tube-well irrigation, (*a*) the area must be in alluvial formations where water-bearing strata at various depths are found ; (*b*) cheap power for lifting water must be available ; and (*c*) the soil should be of good quality so that high costs involved in the operation of tube-wells are compensated by larger produce.

(*ii*) TANKS : Tanks are really hollows, natural or artificial, in which rain water is collected and stored up. Tank irrigation is mainly prevalent in Tamil Nadu, Orissa and Andhra. More than 4 million hectares of land are irrigated by tanks, of which one million hectares are in Andhra Pradesh, 900,000 hectares in Tamil Nadu and 300,000 hectares in Orissa, U.P. and West Bengal each.

Both wells and tanks require comparatively small outlays of capital, yield quick results and can be executed speedily with local resources. Tanks, however, fail to store water when there is failure of rainfall in the locality.

(*iii*) CANALS : This is the most important type of irrigation in India. Canals may draw their water either from rivers or from artificial storage. Canals are mostly constructed in Northern India, where the rivers have a flow of water throughout the year. Storage canals are mainly constructed in the Deccan. Here the rivers dry up during the hot season and, therefore, artificial storage is necessary. Rain water is stored across a valley by building a dam and then distributed to the neighbouring lands by means of canals. About 11 million hectares are irrigated through canals. The total capacity of India's canals is over 220,000 cusecs, and the canals are over 60,000 miles in length.

River canals are of two classes : (*a*) Inundation canals and (*b*) Perennial canals. The inundation canals obtain water when the river rises above a certain level. Thus the canals depend for their supply of water on the natural flood level of the river. When the level is low, canals do not obtain water, but when the river is in flood, they permit widespread cultivation. Irrigation is thus suspended from October to April when the level of the water is low. During this period cultivation is practised with the help of well-irrigation. To remedy this defect perennial canals are constructed.

The perennial canals draw their water from rivers which have their flow of water throughout the year. Some form of barrage is put across a river and its water is diverted by means of canals to the neighbouring areas. The great canal systems of the U.P. and Punjab are of this type. Many of the inundation canals are being transformed now into perennial canals. By perennial irrigation, agricultural production in the "uncertain zone of rainfall" has been enormously increased, for unlike the inundation method it affords its full advantage in the reason and so permits cultivation all the year round.

The conditions are excellent for developing irrigation in Haryana and Punjab. The States are flat, with soft alluvial soil. The development of canal irrigation has transformed large areas

of semi-deserts into fertile agricultural lands. About 3 million hectares of land are irrigated by canals and wells in these two States.

The important canal systems in the two States of Haryana and Punjab are : (*a*) Western Jamuna Canal, (*b*) Upper Bari Doab Canal, (*c*) Sirhind Canal, (*d*) Eastern Canal and (*e*) Nangal barrage.

(*i*) The Western Jamuna Canal takes its water from the Jamuna river and irrigates the districts of Rohtak, Hissar, Patiala and Jhind. More than 200,000 hectares of land are irrigated by 1900 channels of the canal. The canal is being remodelled to serve an additional area of 255,000 hectares with irrigation.

(*ii*) Sirhind Canal takes its water from the Sutlej river at Ruper and irrigates the districts of Ludhiana, Ferozepur and Hissar, and Nabha. This canal is one of the most stable canals in all India. About 400 hectares of land are irrigated by this canal system.

(*iii*) The Upper Bari Doab Canal takes its water from the Ravi river at Madhopur and irrigates the districts of Gurdaspur and Amritsar.

In Tamil Nadu about 3 million hectares of land are irrigated by tank-canals. The percentage of the area irrigated to the total area sown in Tamil Nadu exceeds 40. The Periyar canal system is one of the best examples of irrigation that exist in Southern India. The flat land around Madura covering an area of 35,000 hectares is watered by the Periyar river. The Mettur irrigation system on the Cauvery river is the biggest in the Union and the "largest single block masonry reservoir in the world with a storage capacity of 93,500 million cubic feet." The other irrigation works in Tamil Nadu are Perinchani, Lower Bhavani, Araniar reservoir, Sathanur and Pullambadi canal system.

U.P. has the largest irrigated areas in India. Of the total cultivated area of 17 million hectares, the irrigated land accounts for about 5 million hectares. The prosperity of the Uttar Pradesh is largely founded on the great irrigation works. Irrigated regions cover nearly 27 per cent of the area sown.

Rainfall in the Upper Ganges valley is under 40 inches and irrigation is of vital importance. There are five large canal systems in the state.

(*i*) The Ganga Canal with its headwater at Hardwar, irrigates over 600,000 hectares of land and is the most important system of the State. The main canal is 300 km. long with branches and distributaries totalling 6000 miles. It also supplies water to the Agra canal and the Lower Ganges Canal.

(*ii*) The Agra Canal is taken off from the Jamuna near Delhi. It irrigates over 145,000 hectares of land.

(*iii*) The Lower Ganges Canal is taken off at Narora in the district of Bulandshahr. The total length including channels exceeds 5,000 km. It irrigates 350,000 hectares of land.

(*iv*) The Sarda Canal is the largest productive canal of the State. The Sarda is one of the tributaries of the Ganga. The headwaters are situated at Banbansa on the border of Nepal. It irrigates Rohilkhand and the western part of Oudh. The Sarda system today commands an area of a little more than 1 million hectares of land.

(*v*) The Eastern Jamuna Canal serves the north-eastern part of the State. The canal takes the water from the Jamuna near Faizabad.

The progress of irrigation in India has not been very rapid. From 20 million hectares in 1949, irrigation served in 1969 a little more than 26 million hectares. There is a great scope for irrigation in West Bengal, Bihar, Madhya Pradesh, Orissa, southern Uttar Pradesh and the whole of Peninsular India. The possibilities of diverting the normal flow of rivers into irrigation canals, however, have been almost exhausted. The future development of irrigation will be to store surplus river flow during the monsoon by constructing dams and to distribute the stored water in dry season.

In West Bengal, only about 1 million hectares are irrigated by canals out of the total cultivated area of 16 million hectares. The two important irrigation works are Damodar Canal and Mayurakshi. The new projects are the extension of the Mayurakshi, Damodar valley and Kangsabati. The need for irrigation facilities is urgent as at many places in the districts of

Birbhum, Bankura, Burdwan and Midnapore, the rainfall is much below the quantity required for cultivation.

In spite of the presence of irrigation facilities, under-irrigation has become a major problem in many areas. It has been estimated that out of three million hectares of land which can use irrigation water because of the completion of a number of irrigation projects, only about 1.5 million hectares of land make use of such facilities. The reasons for under-irrigation are : (*a*) inadequate field channels and (*b*) high water charges. Many cultivators cannot make full use of water from irrigation schemes because of the high water rates and levies. Since water charges are levied on the basis of cost of irrigation schemes and not on the net benefit accruing to the cultivators, the under-irrigation continues.

Flood-control, drainage and anti-waterlogging are closely related to irrigation. There is urgent need for providing drainage in irrigated areas to prevent their deterioration by rising ground water table and consequent water-logging conditions. Water-logging in certain parts of the country, in particular the Punjab, has become a very serious problem. Anti-water-logging measures such as drains, lining of irrigation channels in selected reaches and other steps to depress the ground water table have been taken on an extensive scale. Flood control schemes are also under way in many areas, where floods occur frequently and destroy crops during the monsoon. The Brahmaputra in Assam, the north-west rivers of the Punjab and U.P., and the rivers of Madhya Pradesh, Andhra Pradesh, West Bengal, and Kerala are receiving attention for flood control. The Central Government has set up *Central Flood Control Board* to co-ordinate the work of various States in this regard.

River Disputes for Sharing Advantages

Notwithstanding India's having abundant resources in rivers, the sharing of advantages in their use has given rise to some disputes, between States. The rivers of India flow through different States and each State is as anxious as others to derive maximum advantages from a river for the promotion of irrigation facilities and power. The rivers which are in dispute today are the Narmada, Krishna and Godavari.

The Narmada with its length of 815 miles traverses through Madhya Pradesh, Maharashtra and Gujarat. Of this, 669 miles is through Madhya Pradesh, 21 miles on Madhya Pradesh-Maharashtra border, 25 miles on Maharashtra-Gujarat border and 100 miles in Gujarat State. The Narmada river system is capable of irrigating 8 million hectares of land and providing 2000 mw of power. Because of the independent claim by each State, the utilisation of the Narmada system is being delayed.

In 1965, the Government of India appointed a committee to go through the claims of the different States and to suggest a line of action that would serve the national interest first. The committee recommended that the benefits of irrigation and power from the Narmada should be distributed as follows : Madhya Pradesh (6.5 million acres), Gujarat (4.5 million acres), Rajasthan (7 lakh acres) and Maharashtra (10,000 acres). The power is to be distributed to Madhya Pradesh (1592 mw), Gujarat (211 mw) and Maharashtra (211 mw). The recommendations have not been accepted by Madhya Pradesh and Maharashtra. Madhya Pradesh considers the Narmada as its own river, and insists that of the total 28 million acre feet of water as much as 22 million acre feet must be kept for her as against 18 million acre feet suggested by the Government. Madhya Pradesh feels that Gujarat should have only 5.6 million acre feet and not 16.6 million acre feet as demanded by Gujarat.

Another dispute is in respect of the Krishna-Godavari rivers involving Andhra Pradesh, Mysore and Maharashtra, each putting its own demand for water for irrigation. It appears that their total demand exceeds three times the water available. Similarly, there are disputes involving Kerala, Mysore and Madras.

According to Inter-State Water Disputes Act of 1956, these disputes are being referred to arbitration.

Indus Waters Treaty

Mention may be made here of a treaty signed by India and Pakistan in 1960 concerning the use of the waters of the Indus

(*ix*) The Cauvery System.
(*x*) The Madhya Pradesh river system of the Tapti and Narmada.
(*xi*) The Malwa river system striking the Eastern borders of Rajasthan and centering round the Chambal which drains to the Jamuna.

For the development of some of these river-valleys, a number of multi-purpose projects and major irrigation schemes are being developed. By the end of 1969 from the beginning of 1951, India had undertaken more than 536 major and medium irrigation projects, of which 300 are already in operation, bringing 6.8 million hectares under cultivation.

Some of the multi-purpose river valley projects which are in operation are the following :

(*a*) The Damodar Valley Project (of the Hooghly basin)
(*b*) The Hirakud Project (of the Orissa river system).
(*c*) The Narmada Project (Gujarat).
(*d*) The Tungabhadra Project (Andhra Pradesh and Mysore).
(*e*) Ramganga Project (U.P.).
(*f*) Bhakra-Nangal Project (Punjab and Rajasthan).
(*g*) The Nagarjunsagar Project (Andhra Pradesh).

These projects provide irrigation and generation of electric power for industrial purposes, and also control floods and remove malaria, foster navigation, land reclamation, fish culture, etc.

Some major irrigation schemes, now under construction are as follows:

Name and State	Utilisation gross area (on completion) (in '000 hectares)
Chambal (Rajasthan and Madhya Pradesh) ...	470
Khadakvasla (Maharashtra)	19
Koshi (Bihar)	460
Narmada (Gujarat)	320
Rajasthan Canal (Rajasthan)	560
Sone Project (Bihar)	125

In addition, there are important State projects like Mor ver (West Bengal) and Ramapadasagar (Andhra). The Mor ver project of Bengal will bring irrigation to 300,000 hectares nder kharif and 280,000 hectares under rabi. The dam will be 17 feet high to store 0.5 million acre feet of water. The amapadasagar project aims at irrigating 1 million hectares of nd in Andhra. It will develop 150,000 kw. of firm power and rovide, in addition, navigation facilities from the port of ishakhapatnam to the hinterland of the lake.

Damodar Valley Corporation Project (West Bengal and Bihar)

The Damodar (also known as the River of Sorrow) is about 00 km long. It has its source in the Hill of Chotanagpur at n elevation of 2,000 feet. After flowing for 240 km in Bihar enters West Bengal and ultimately joins the Hooghly. In s upper valley lie parts of Hazaribagh, Palamau, Ranchi, anbhum and Santal Parganas in Bihar. Here the rainfall is bout 47 inches annually, most of which falls during the mon- oon. "Torrential rains crash down upon the deforested hills, nd the unimpeded rain-water tumbles down the hills into the iver. The unchecked flow erodes land in Chotanagpur and wells the volume of water in the river." The lower portion f the valley lies in West Bengal, where the flooded Damodar verflows its banks, destroys crops and dwellings, carries away en and cattle, disrupts communications and dislocates tempo- arily the economic life of the valley. The Damodar valley has catchment area of about 12,000 square km.

The Damodar Valley with its surrounding areas is the ost highly developed industrial region in India. In it are ituated India's two largest iron and steel plants, her largest ertilizer plant, the Government locomotive works and cement orks.

The upper Damodar basin is very rich in timber, lac and ussore. The lower basin, though very fertile, is without proper ystem of irrigation for which intensive cultivation is not pos- ible. The Damodar Valley contains the largest coal deposits India and considerable quantities of bauxite and aluminium. The valley has also fire clay, china clay, mica, limestone, lead,

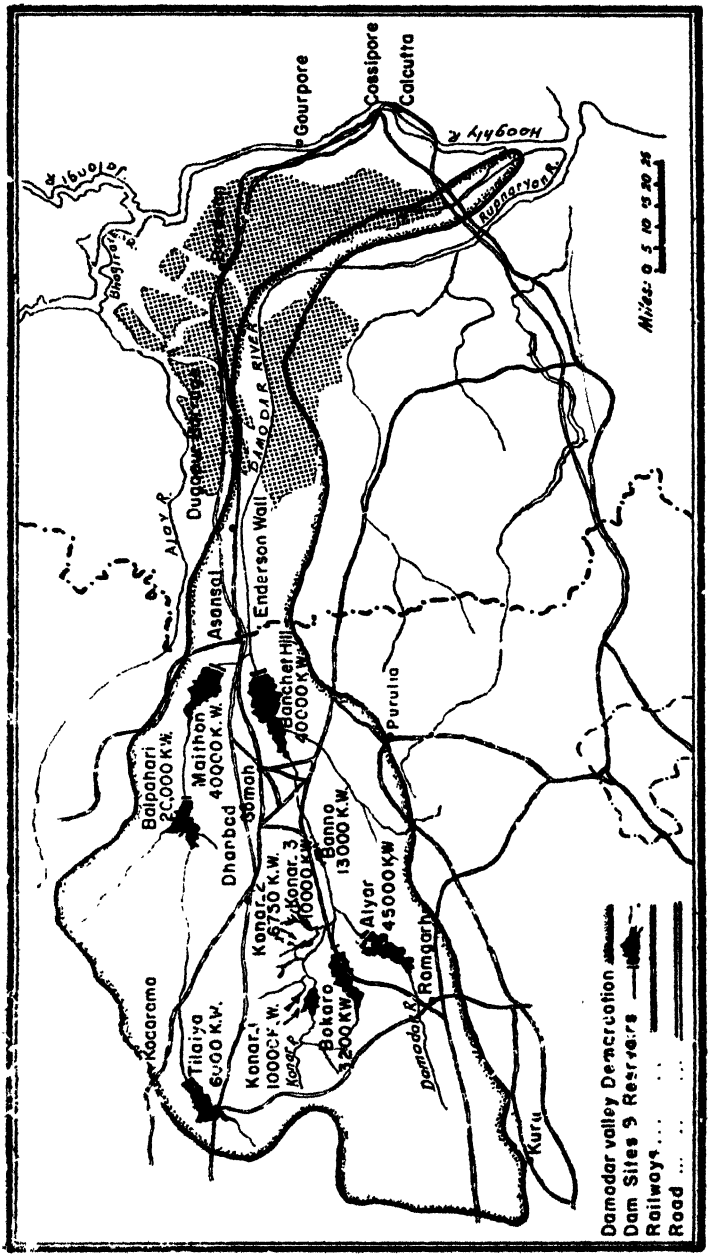


FIG. 86. The Project by taming the Damodar and its tributaries has controlled flood and malaria, and has become an important supplier of Power.

silver, antimony and quartz. With cheap electric power, these minerals can be properly exploited.

The Government of India in 1948 set up by an Act a Corporation to implement the Damodar Valley Project. The Damodar Valley Corporation is in charge of execution and operation of schemes for irrigation, the generation of power and flood control. There will be provision for all-the-year round navigation, afforestation, public health and industrial, economic and general well-being of the people of the Valley.

The project comprises four storage dams with hydro-electric installation at *Maithon on the Barakar, one across the Konar, Tilaiya on the Barakar and one near the Panchet Hill on the Damodar;* three thermal power stations at Bokaro, Durgapur and Chandrapura; an extensive power transmission grid and an irrigation barrage at Durgapur with canals and distributaries. The 2,271 feet high barrage at Durgapur in West Bengal was completed in 1965. It irrigates over 400.000 hectares of land through canals. There will also be a navigation-cum-irrigation canal 130 km. long which will be connected with the Hooghly 45 km up-stream from Calcutta. The canal will handle coal and other materials between the Damodar Valley and Calcutta. The canal will have a system of distributaries of 2,000 km in length. The thermal power station at Bokaro which was opened in 1953 utilises low grade coal for 200,000 kw. power which evens out seasonal fluctuation of hydro-electric power. The four dams at Tilaiya, Konar, Maithon and Panchet Hill have an aggregate storage capacity of 2.89 million acre feet of water with an installed hydro-electric capacity of 146,000 kw. Flood reserves are provided at Maithon and Panchet Hill to cut down floods from 650,000 cusecs to 250,000 cusecs. The Tilaiya Dam above the river Barakar was opened in 1953 and is 1,200 feet long and 112 feet high. It moderates flood level and supplies water for irrigation to serve about 40,000 hectares of land. It is estimated that the irrigation system will help to get an additional production of 400,000 metric tons of food grains. There will also be fish culture in the lake.

The Konar Dam on the Konar, a tributary of the Damodar, is 12,860 feet long and 196 feet high. The Dam was completed in 1954. About 40,000 hectares of land are irrigated from the

storage water. It also gives 19,10,00,000 kw. hours per annum. The Maithon Dam has been constructed across the lower reaches of the Barakar. It regulates floods, provides 16,40,00,000 kw hours per annum of hydro-electricity and supplies water to 90,000 hectares of land for cultivation. The Maithon dam is 11,773 feet long and 158 feet high. The central location of the Maithon dam makes it the chief centre for distributing power to Sindri, Chittaranjan and other workshop areas. The Panchet Hill Dam which has been recently completed, is designed primarily to control flood. A hydro-electric station of 40,000 kw. has been built near the dam.

Soil and water conservation in the Damodar valley is an integral part of the DVC Project. Without soil conservation the dam reservoirs silt up quickly; and if soil erosion is allowed to continue, more of the top soil will be washed away. Therefore extensive soil surveys have been made. A number of small irrigation-cum-soil conservation dams were constructed in the upper reaches of the valley in the earlier part of the DVC's career. The Adivasi dam, Deochanda dam, Bachhi dam and Gauria Karma dam hold back rain water, prevent gully erosion and supply water for irrigation.

Other activities of the Damodar Valley Corporation are to assist in the development of small scale and cottage industries by investigation into their possibilities and starting plot schemes.

The original scheme of the DVC was to have eight dams. With four dams, the multi-purpose activities are not being carried out effectively. The power-system has extended far beyond the valley and far beyond what was originally contemplated. The Ruhr of India, that is, the new industrial region between West Bengal and Bihar has put tremendous pressure for the supply of power from DVC. The growing consumption of canal water in the new industrial area has brought about acute shortage of water for rabi irrigation. The need for thermal power is keenly felt because of the variation in the supply of hydel power between seasons.

Other River Valley Projects

The Hirakud Dam Project is designed to supply water for irrigation and power for industrial development of Orissa. It

comprises of a dam across the Mahanadi about nine miles upstream off the town of Sambalpur. There are canals on either side of hydro-electric installations. The Hirakud dam is 150 feet above the river-bed with gross storage capacity of the reservoir of 5.3 million acre feet. Two other dams have been constructed on the Mahanadi—one at Tikarpara and the other at Naraj, few miles west of Cuttack. The three projects, will provide irrigation to 1 million hectares of land, generate 3,50,000 kw. and will also provide navigation facilities. The whole of the Mahanadi Valley particularly Sambalpur district, Sonepur and the delta region will be specially benefited by these schemes. The Hirakud project will irrigate 200,000 hectares of land in Sambalpur and Bolangir districts, and half a million hectares in Cuttack and Puri districts. The areas served by the Hirakud are very rich in minerals like iron, bauxite, manganese, graphite, chromite, mica and other useful minerals, most of which are largely unexploited. The Hirakud will supply power for their development. The main dam and dykes have been completed in all reaches, and these provide irrigation facilities for 150,000 hectares of land. Power is now being supplied to Hirakud for Indian aluminium factory, Rajganjpur for the cement factory, Rourkela for steel plant, Joda for ferro-manganese plant, Brajarajnagar for paper mills and Chawdwar for textile industries. Hirakud is supplying power to Cuttack, Puri, Sambalpur and Sundergarh.

The *Kosi Project* is the most important scheme in Bihar. It is a multi-purpose project for irrigation, power, navigation, flood control, silt control, silt conservation, drainage, reclamation of water-logged areas, malaria control, fish culture and recreation facilities. The project comprises dam about 750 feet high across the Chatra Gorge in Nepal to store about 11 million acre feet of water. There will be two barrages on the Kosi: —(*a*) The first one in Nepal will control and stabilise the river channel and will divert its supplies into two canals on either side. About a million acres of land in Nepal territory will be irrigated by these two canals. (*b*) The second barrage will be near the Nepal-Bihar border, where two canals on the left and one on the right will be constructed for irrigating over two million acres in the districts of Purnea, Darbhanga and Muzaffarpur in Bihar.

The power plant at the dam site will be capable of generating 1.3 million kw. of cheap power.

The Tungabhadra Project comprises a dam 8,200 feet long and 160 feet across the Tungabhadra, a major tributary of the Krishna. The reservoir contains 2.6 million acre feet of water and serve Mysore and Andhra. About 200,000 hectares of land will be irrigated by the scheme. The dam was inaugurated in 1953.

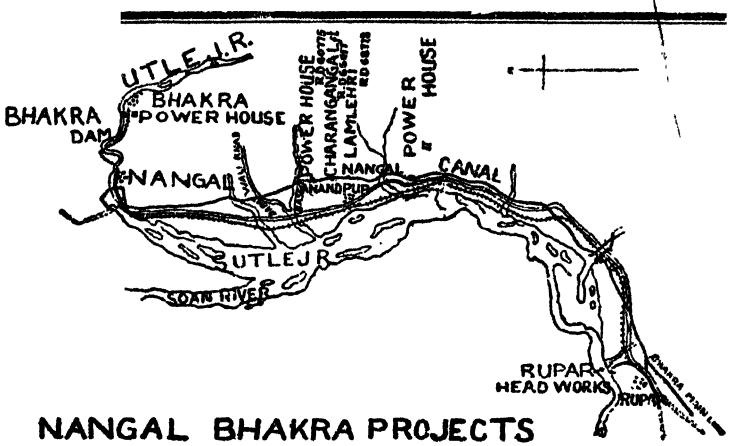


FIG. 87. "Bhakra-Nangal project is something tremendous, something stupendous, something which shakes you up when you see it. Bhakra today is the symbol of India's progress."—Nehru.

The *Bhakra and Nangal Project* is the only multi-purpose scheme in Punjab and Haryana. The essential feature of the Bhakra project is a cement and concrete dam, 740 ft. high, across the river Sutlej at the site of Bhakra Gorge, about 75 km upstream of the present headwaters of the Sirhind canal in Punjab. The total storage capacity of the reservoir is 7.2m cubic ft. of which nearly 5.5m cubic ft. is available for hydro-electric power generation and irrigation purposes every year. The reservoir level has been kept at 1,680 ft. above sea level. The dam ranks as the highest straight gravity dam in the world, and surpasses the Hoover Dam in Nevada (U.S.A.) which is 720 feet high.

Stored water provides irrigation facilities for nearly 6.6m acres of land and generate about 230,000 kilowatts of electric energy. A additional 170,000 kilowatts is produced on the Nangal hydro-electric canal which forms a feeder channel for the Bhakra canal system.

The length of the dam at the top is about 1,700 ft. and the width of the base at its widest point is about 1,100 ft. A 30 ft. roadway is provided at the top. Partial storage of water above the Bhakra dam started in 1958, and in 1959 about 6.30 lakh hectares were irrigated by the Bhakra Canal System in the Punjab and Rajasthan. On full development 13 lakh hectares of land will be irrigated, and another 14 lakh hectares will get increased water supply.

It helps to get additional foodgrains of 1.3 million tons a year, cotton 0.8 million tons, sugar-cane 0.5 million tons and oilseeds 0.1 million tons. No other river valley project in the world has so much food potential.

The Nangal scheme provides for an auxiliary dam or barrage across the river at Nangal, about 12 km down-stream canal and serve as a balancing reservoir for taking up daily fluctuations from the Bhakra dam and for meeting daily and weekly load variations on power houses on the Nangal hydro-electric canal. The Nangal dam is a massive concrete weir, 1,029 ft. long, 400 ft. wide and with its deepest foundations going down to 50 ft. below the river bed. The waterway consists of 28 bays 30 ft. wide, each provided with a steel gate to head up the water about 50 ft. above the river bed. The Nangal-Hydel channel takes off from the left bank of the river above the Nangal dam and is about 63 km long. It has a carrying capacity of 12,500 cusecs. The two power houses are at Ganguwal, 18 km down Nangal, and Kotla 9 km further down. The Nangal-Hydel system supplies electric power to Rupar, Ambala, Karnal, Panipat, Hisar, Bhiwani, Rohtak, Nabha, Patiala, Ferozepur, Faridkot, Kalka, Kassauli, Simla, Julundhur, Hoshiarpur, Kapurthala, Dhilwan and 49 other small cities. Electric power has been extended to Delhi, Gurgaon, Palwal and Rewari from Ganguwal and Kotla power houses since September 1957.

The hydel power is also used extensively for tube-well irrigation in several areas of Punjab which are not served by canals. Tube-wells also serve to de-water the water-logged areas and supply this water elsewhere in dry areas. In course of time power will be used for railway electrification, especially on the main line between Delhi and Amritsar.

In spite of the tremendous hydel power supply from the Bhakra-Nangal project its inadequacy is now felt because of expansion of many industries in the Punjab, Haryana and the Greater Delhi area.

The *Rihand Valley Project* is by far the most important multi-purpose scheme in the Uttar Pradesh. The dam at Pipri, in the Mirzapur district, on the river Rihand which is a tributary of the Sone will be the largest reservoir in India. The dam will be over 2,000 feet long, and the storage capacity of the reservoir will be 90 lakh acre feet. The surface area of the lake created will be 300 sq. km.

The scheme will confer numerous benefits on the country.

(*a*) The eastern parts of the State do not have any proper irrigation system and entirely depend upon rainfall for crops. The scheme will make possible the construction of 3,000 tube-wells and 6,000 km. of pumped canals from the Gogra, Ganga and Jamuna rivers. Thus, large tracts of unbroken land will be cultivated for food production: (*b*) fish culture will be possible in the huge lake ; (*c*) the canals will bring the unexplored region of the Sone valley in touch with the Ganga. Large cargo vessels will ply between the Hooghly and the Rihand ; (*d*) industrialisation will take place in the wake of the Project. The region is one of the richest in mineral wealth ; (*e*) some sections of the Northern Rly. can be electrified to save coal. The power raised from the water will result in the saving of 20,000 wagons of coal per year. Shortage of power has been an impediment in the economic development of the eastern districts of U.P. The opening of the first power house in 1963 has already helped the cement and aluminium production in the area.

Other benefits of the scheme will be the control of floods in the Rihand and the Sone, lesser soil erosion in the Rihand valley, better afforestation in Rewa and restoration of marginal lands. Thus it is an ambitious undertaking designed to pave

the way for the agricultural and industrial advancement of the eastern parts of the State and is destined to become a landmark in the development of India.

Rajasthan Canal Project

In order to provide water for irrigation to Bikaner, Jaisalmer and Ganganagar, covering an estimated area of about 2.6 million acres, there is a project for the construction of a canal from the river Sutlej at Harika barrage. To begin with, the canal will be fed by flow supplies from the Ravi and Beas rivers. There is also a proposal to construct a number of dams on these two rivers to increase the supplies of water through the canal. The Rajasthan canal will be 470 km long, lying entirely in Rajasthan.

Fourth Plan and Irrigation : The objectives are the integrated use and efficient management of water resources ; extension of irrigation—major, medium and minor ; and new projects in areas which are relatively deficient in rainfall and irrigation. The ultimate area that can be irrigated (excluding ground water) has been assessed at 60 million hectares. It is proposed to bring about during the Fourth Plan, an additional utilisation of 5 million hectare metres.

7. Forests and their Products

India has 7.53 lakh sq. km of land under forest, *i.e.*, 23 per cent of the total land area. Throughout this vast forest-area there is a variety in the types of forest vegetation, depending on variations of climate and soil and on other local factors. About 12 p.c. of the total area may be classified as merchantable forest. From the point of outturn, Indian forests are classified as marketable and inaccessible. The marketable forests constitute 83 per cent of the total forest area. The bulk of marketable forests consists of non-coniferous type.

Considering the fact that India has tropical climate, periodic monsoons, low forest productivity and predominantly agricultural economy, there is need for increasing the forest area by at least another 10 p.c. of the total area.

The forests in India are very unevenly distributed, Madhya Pradesh, Assam, Orissa and Andhra Pradesh have the largest concentration of forests. They are most scarce in the Gangetic area.

India has more than 5,000 different species of trees in India and half of them are timber trees and the rest are shrubs and climbers. The extension of urban areas and the agricultural fields has resulted in the gradual decline of forests in India.

GEOGRAPHICAL DISTRIBUTION OF FORESTS, 1969

Area in thousand hectares.

States	Area	States	Area
Andhra Pradesh ...	4,801	Orissa	360
Assam	5,570	Punjab	210
Bihar	2,001	Rajasthan ...	1,080
Maharashtra ...	5,569	U.P.	2,829
Kerala	880	West Bengal ...	698
Madhya Pradesh ...	12,000	Jammu and Kashmir	460
Tamil Nadu ...	1,661	Tripura ...	527
Mysore ...	2,130	Total India ...	75,300

There is no proper balance between agricultural and forest lands in India. While Madhya Pradesh, Assam, Andhra Pradesh and Orissa have sufficient forest areas, most of the other regions have much less than the minimum required for proper land use.

Broadly speaking, there are five types of forests in the country :

(1) Arid country forests, extending over a considerable portion of Rajasthan and the south of the Punjab. The most important tree is the babul.

(2) Deciduous forests extend over large areas in the sub-Himalayan tract, and in the Peninsular India. Sal, teak and a great variety of other valuable trees are found in these areas.

(3) Evergreen forests occur in those areas where the rainfall is heavy. Such regions are the west coast of the Peninsula, and the eastern sub-Himalayan tract. The trees are bamboo, palm, fern and Indian rubber.

(4) Hill forests. They vary according to elevation and rainfall. In the Eastern Himalayas and Assam the forests are full of oak and magnolia. In Assam pine trees grow abundantly at an elevation of 3,000 to 6,000 ft. Deodar, pine and oak occur in the North-Western Himalayas.

(5) Littoral forests occur on the sea coasts and along tidal creeks. The most characteristic trees belong to the mangrove family.

Importance of Forests

Indian forests have important protective as well as productive functions. They provide employment for nearly a million people such as wood-cutters, sawyers, carters, carriers and raftsmen and play an important part as suppliers of raw materials for various industries like timber, matches, ply-wood, paper and pulp, pencil, rayon, resin and tanning. Forests also supply fodder and sustain 32 million livestock. In India forests also have a moderating influence against floods and erosion and help maintain soil fertility. Indeed, the forests are vital in India's economy. Unfortunately, the unsound conservation policy in the past did not allow for much planned increase of forests.

The expanding cultivation in India has broken up, in certain cases, even the reserved forests. The devastation and abuse of forests have brought about steady deterioration of physical and climatic conditions, the drying up of many springs, silting up of water channels and loss of fertility of top soils in many regions. Several parts of the country which were once cool and richly wooded are now arid. The Siwalik hills extending from the Punjab to Assam are almost bare; their streams are choked with sand. The forest at Nagpur in the Kulu valley is a barren hillside. Deep ravines have been cut into the banks of the Jamuna, the Chambal, the Narmada and the Mahi. The Rajasthan desert advances towards the Gangetic plain at the rate of nearly half a mile a year over a front of about 100 miles; desiccating winds and desert sands blowing through the Abu tunnel are raining annually over 70 square km of fertile territory. The shores of the sea, in Gujarat, are strewn with advancing sand dunes. The hill-sides of the Himalayas in Kumaon, being fast eroded for want of trees, have lost their valuable top

soil by erosion and thousands of square miles of fertile land have been thrown out of use. It is necessary that at least 60 per cent of the land area should be under forests for protection against erosion, floods and denudation in the Himalayas, Deccan plateau and other mountainous regions. Deforested mountains give rise to floods and soil erosion. If rivers are to be used properly for irrigation and navigation, mountains should remain forested. In the plains, where the configuration of the ground is gentle, the irreducible minimum should be 20 per cent. In other words, the overall proportion of the forest area in India should be raised to 33 per cent.

The *Vana Mahotsava* festival was inaugurated in 1950 with a view to encouraging the planting of trees throughout the country in all waste lands unfit for cultivation, along canals, roads and railways. In the same year about 4 crores of trees were planted of which 25 per cent survived. In 1951 also 4 crores of trees were planted. Since then the *Vana Mahotsava* has become an annual feature for the plantation of trees for the production of fuel wood and soft wood. A scheme for the immobilization of the Rajasthan desert has been prepared, the principal features of which are as follows : (*a*) Creating a belt of forest 400 miles long and 5 miles wide, parallel to the Pakistan boundary and 5 miles inside Rajasthan ; (*b*) Creating oases of vegetation round railway stations, police stations, etc. ; (*c*) Establishing shelter belts along selected roads and railway lines ; (*d*) Creation of wind breaks round agricultural fields and adoption of improved agricultural practices.

In 1968, several other measures were undertaken to improve the productivity of forests through raising forest plantations and development of forest communication. In the same year, new plantations of economic species like teak, sal, sisso, and eucalyptus have covered 54,000 hectares.

Forest Products

The forest produce is divided into two main heads : (1) major produce, and (2) minor produce. The major produce consists of timber, round wood, pulp and match wood, firewood and charcoal. The minor produce include lac, tanning mate-

rials, honey, wax, bamboo, thatching grasses, essential oil, turpentine, resin, cane fibres and katha.

In recent years, there has been considerable progress in the production of timber in India. This high production has been possible because of the following factors :

(*a*) Opening of inaccessible areas by the construction of new roads and paths ;
(*b*) appearances of mechanical traction ;
(*c*) increased demand for timber for constructional and other purposes ; and
(*c*) exploitation of species hitherto unacceptable for trade and new industries.

Important timbers include deodar, sal, rose-wood, padauk, Indian mahogany and teak. Several industries are making use of wood directly as a material. The forests provide cellulosic raw materials in increasing measure for the production of paper needed for educational and other programmes.

Every advance in industrialisation will be reflected in an increased demand on timber. "Most advanced countries in the world are precisely those with the highest per capita consumption of wood. India's per capita consumption of round wood is 1.4 cubic feet as compared with 58 cubic feet in the U.S.A." It has been estimated that requirements of industrial wood which amount to 4.5 million tons at present would increase to about 9.5 million tons in 1975. Since forests are replaceable at a slow rate, and the demand for timber for industrial purposes is on the increase, it is desirable that forests should not be exploited indiscriminately.

The forests of the country supply a large variety of minor forest products. Various plants and their derivatives account for items such as essential oils, resins, gums, medicinal herbs, flosses, edible wild plant, canes and grasses. In addition, animal products such as honey, bees-wax, lac, bones, hides and horn play an important role of their own both in the home markets and abroad. The chief difficulty in organising the commercial exploitation of these products arises from their erratic distribution which reduces their economic value. While such well-known items as bamboos and lac are being cultivated or reared

and utilised on a fairly satisfactory scale, better methods of rearing, collection, extraction and marketing should be possible with a view to ensuring quality as well as regular and adequate supplies of all minor forest produce.

Lac is secreted by a type of insects which feed on the saps of certain trees known as lac hosts. These trees are palas, ber and kusum, and are found in the south-eastern districts of Bihar, the western border areas of West Bengal, and adjoining districts of Bihar, Uttar Pradesh, Madhya Pradesh, Orissa and Assam. Chotanagpur in Bihar raises 60 p.c. of India's total At present, the production of lac in India is about 41,000 tons which is over 75 per cent of the world's output. About 40 p.c. of the total production comes from Bihar followed by Madhya Pradesh with 30 p.c. and Maharashtra 19 p.c. Lac industry engages over four million cultivators apart from several thousands engaged in the manufacturing industry and the trade.

Lac is used in making gramophone records, varnish, electric insulation, sealing wax, lithographic ink and others. About 35 p.c. of lac is consumed in the gramophone industry. Only about 10 p.c. of stick lac is consumed in India, and the rest is exported. Best customers of the Indian lac are the U.S.A. and the U.K. About 90 p.c. of the total lac export is handled in Calcutta. Recently, the Indian lac industry has been threatened by competition from cheaper Siamese lac and the discovery of several special-purpose synthetics. The U.S.A. is now taking less Indian shellac for gramophone record manufacture.

Resin is derived from the pines of the Himalayas and Assam hills and is worked for making resin and turpentine oil. Resin is used for shellac adulteration, in paper mills, soap factories, etc., while turpentine is in demand for medicine and varnish.

Myrobalans grow in abundance in Tamil Nadu. Maharashtra, Bihar, West Bengal, Orissa and other places. A variety is found in Coimbatore whose fruits are very small in size, but the tree is taller than the *peepul* tree of Northern India. The fruits, the bark, the leaves, the trunk—every part of the myrobalans has some use or other for us. The timber is very strong. The Jabalpore myrobalan is the best of all and is used for the preparation of medicine and dyes. *Myrobalans is a great toner in tanning.* The alkali of myrobalans is useful for preparing

different dyes by mixing with various ingredients. In Madras myrobalans are extensively used for dyeing cotton, wool and skin. In Assam, *Endi* and *Muga* silk are dyed with myrobalan alkali. England, Germany, Belgium, the U.S.A. and Australia are the chief importers of Indian myrobalans.

Of late, many forest products have also assumed great importance as raw materials for medicinal and perfumery purposes. Sandal-wood oil, palmorosa (from Rosa grass), linaloi, and vetiver are important essential oils. Margosa (Neem) oil is regarded in India as a specific for skin diseases and is used in soaps. Drug-plants are also exploited in India and these include Atropa, Belladona, Hyoscyamus, Podophyllumemodi. Nux Vomica, and Artemisia Previfolia. Other drugs include Aconite, Mentha, Juniper, etc.

Developments and Problems

Development of farm forestry, economic plantations, rehabilitation of degraded forests, improvement of forest communication measures are being carried out under the Development Schemes.

Arrangements have been made for the supply of Andaman timbers to the match and plywood industry in consequence of which the necessity of importing tea-chests has been obviated to a large extent. Attempts are also being made to meet the chronic shortage of newsprint in this country by tapping the hitherto unexploited forest of spruce and fir in the Himalayas.

The timber experts believe that preserved and treated wood and pressurised bamboo could replace steel in a variety of ways. India has a wide variety of timber and a large surplus of bamboo in the forests. The timber-for-steel scheme, if successful, may solve the steel problem which is retarding industrial development not only in India but in other countries in Central and South Asia.

The Forest Research Institute at Dehra Dun is engaged in (*a*) finding out suitable woods for aircraft construction, (*b*) producing cheap printing paper, (*c*) discovering indigenous woods suitable for use as battery separators, etc. and (*d*) investigating pencil woods. A systematic investigation of pencil woods has shown that not only is Indian deodar suitable for first class

pencils, but is also superior to the East African deodar on which the Indian Pencil industry largely depends at present.

Many forest areas of the Himalayas are almost inaccessible because of steep and rocky slopes. The question of *bringing timber and other materials from forests to the road, railway or river that leads to the place of utilization*, is thus the main problem of the forest industry. At present two methods are applied : (*i*) employment of bullocks, buffaloes and elephants as carriers of forest produce, and (*ii*) timber rafts are floated down the rivers during monsoon months to be dragged again from the water (after, of course, many days of floating) to the saw mills. "Forest roads need to be linked with trunk roads and river landings, so that the timber can be transported or floated easily."

Fourth Plan and Forests. The demand for various forest products both for industrial and for fuel purposes has been fast growing in India. The current production of industrial wood is about 8 million cubic metres, but the demand today is for 18 million cubic metres and will increase to 24 million cubic metres by 1975. One of the problems of Indian forests is relatively low productivity. In order to increase the forest production, the Fourth Plan envisages further efforts at creating large scale plantations of quick growing species and species of economic importance in 640,000 hectares. There will be also plantations of farm forestry-cum-fuel wood in 75,000 hectares. About 14,000 km of roads will be constructed.

Some Important Commercial Timbers

The forests of India are the source of many kinds of timber with varied technical properties.

BAING (*Tectrameles mudiflora*) from Assam is a white soft wood.

BENTEAK from the West coast is a reddish brown moderately hard wood and has considerable demand for furniture, coffee cases, ship-building, etc.

BIJASOL obtainable in Maharashtra, Tamil Nadu and Bihar is a very hard, close-grained durable wood and is used for door and window frames, furniture and agricultural implements.

BLUE PINE (*Pinas excelsa*) from Punjab is much used in constructional work.

DEODAR (*Cedrus Deodara*) is a moderately hard wood, strongly scented and oily and is used for railway sleepers and in building.

DHUPA found along the foot of the Western Ghats, besides giving the gum resin, is used for tea chests and packing cases.

HALDU (*Adina cardifolia*) is found all over India. It is a yellow, moderately hard, even-grained wood and is used for furniture and cigar-box-making.

INDIAN ROSE WOOD is world famous and is found mostly in the forests of the southern part of the Western Ghats. It is also available in M.P. and Orissa. Extremely hard and close grained, this dark purple wood is the highest priced timber in India and is widely used for furniture making.

SHISHAM, otherwise known as *Sisso,* is available in Uttar Pradesh, Punjab, Haryana and West Bengal. This wood is very hard, close-grained and brown in colour and takes a high polish. It is much used for carriage, cart and boat-building all over Northern India.

IRUL WOOD AND MESUA (*Mesua ferra*) are found in Tamil Nadu. Being very durable, they make excellent railway sleepers. Mesua is also available in Assam.

SAL (SHOREA ROBUSTA) is in regular demand in Northern India for building piles, beams, planking, door and window posts and for railway sleepers. The number is available in Assam, West Bengal, Bihar, Madhya Pradesh, Orissa and Uttar Pradesh.

SANDAL-WOOD comes from the dry regions of South India and is a hard, close-grained, yellowish brown wood, strongly scented by the oil characteristic of the tree. It is in demand for making boxes and small articles, often beautifully carved. The oil of the wood is also important.

SEMUL (*Bombax Malabaricum*) is found widely in Assam, Bihar and Tamil Nadu. The timber is soft and white and is used for toys, packing cases and planking.

SUNDRI (*Heriteira Species*), available in West Bengal, is used for boat-building, furniture, beams, planking and posts. The wood is very tough and hard.

TEAK (*Tectonia Grandis*) is extensively found in Madhya Pradesh, Tamil Nadu and Maharashtra. As a ship-building

wood and as a good wood for house carpentry, it has long been known in many parts of the world. In India it is a general purpose timber for house and ship-building, bridges, railway sleepers, furniture, etc.

8. Animal Husbandry

The development of animal husbandry increases the supply of protective foods, provides draught power for farm operations and improves the output of certain products of commercial importance such as hides, bones and wool.

Animal husbandry is an integral part of a sound system of diversified agriculture. The integration of crop production and animal husbandry ensures better utilization of farm by-products, maintenance of soil fertility, fuller employment for cultivators throughout the year and increase in rural incomes.

A large number of farm animals are maintained in India. India has the largest bovine population in the world. Generally speaking, the farm animals are not of appropriate quality for the achievement of objectives.

According to the census of 1968, India had 176 m cattle, 52 m buffaloes, 42 m sheep, 64 m goats, 11 m ponies and horses, making a total of 342 million livestock.

Grazing lands are indispensable for breeding and pasturing of domestic livestock for meat, leather and wool. It is not merely the presence of grass which is important, but the class of stock which will graze on lands. Cattle need leaf and seed of bush species; sheep need weeds; horses need grass; goats need leaves and twigs of bush. The types of vegetation and their locations are also important. All these factors along with the problem of over-grazing need careful attention. The present cattle population in India is considerably in excess of the available supplies of fodder. It is commonly considered that in relation to the supplies of dry fodder at least one-third of the cattle population may be regarded as surplus. It has been estimated that if the food now being consumed by useless animals could be added to the rations of milch animals, there would have been a gain of 365 lb. of milk per animal a year. Problems associated with excessive cattle numbers and the attendant shortage of food supplies are serious, and must be

solved if animal hasbandry is to function profitably.[8] The important cattle-breeding areas are Madhya Pradesh, Andhra Pradesh, the U.P., Mysore and Gujarat.

India stands fifth in sheep population with her 42 million sheep. Broadly, the sheep raising tracts are the Northern region, the Western region and the Southern region. Sheep in India are reared particularly in Haryana and Punjab; Garhwal, Almora and Nainital in the U.P.; Gujarat; the Bellary, Kurnool and Coimbatore districts of South India; Rajasthan; Kashmir.

The Indian sheep is inferior to that of Australia or South Africa as a mutton or wool producer. The wool of Northern India is white and of fair quality while in Peninsular India, it is grey, short and coarse. The average annual production is a little above 80 million lbs. "A good deal of the wool, which comes into the Indian market is dead wool, *i.e.*, what has been removed from the carcasses of slaughtered sheep and not shorn." The need for improving shearing efficiency in India is urgent. Compared to New Zealand, the average rate of shearing per man is very much low.

The average yield of wool per sheep is about 2 lbs., and this can be raised to 6 lbs. with improved varieties of sheep. The demand for wool comes from five main sources, namely, cottage industries, for carpets and floor rugs, for blankets, for manufacture of clothing material and knitting yarns in mills and for other industries like the manufacture of shawls, tweeds etc. There are sheep breeding farms and wool extension centres in Himachal Pradesh, Maharashtra and Madhya Pradesh.

The average annual export of raw wool is about 50 million lbs. of which 36 million lbs. are carpet wool and 15 million lbs. are semi-processed wool. A frequent complaint of the foreign consumers about Indian wool is the presence of excessive foreign matter such as sand, burns etc. Accordingly steps are being taken to ensure correct shearing as well as systematic grading of wool.

[8] There are suggestions that there should be a graduated tax on cattle which would make the maintenance of useless cattle a burden on their owners. Compulsory sterilization of surplus cows is also recommended.

Goats may be considered as the poor man's cheap milk animal. Goat's milk is highly valued for human consumption, but the yield of milk from goats is very small. These animals are valued for their meat and milk and in some places for their hair. Goats are very prolific and they are easily domesticated. About 21 million pieces of goat skin are obtained annually. Mules and horses are used in India mostly for drawing carts, and these are found chiefly in the Punjab, Haryana, U.P., and Maharashtra. Camels are mostly confined to Punjab and Western Rajasthan. In these areas camels are largely used for ploughing and as draught animals.

Animal products in India are hides and skins, bone, wool, milk, butter and ghee. Hides and skin are used for making harnesess, bags, suitcases, trunks, machine belts, automobile tops and seats, cases for guns, shoes and gloves. The term hide denotes the skins of cattle, horses and camels, while the term skin is restricted to those of calves, sheep and goats. In India the hides and skins are mostly collected from the salughter-houses. West Bengal and Tamil Nadu are the largest producers of cattle hides, Tamil Nadu the largest producer of buffalo hides and sheepskins, and the Uttar Pradesh the largest producers of goatskins, followed by West Bengal and Bihar. The leather centres in India are Kanpur, Agra, Calcutta, Delhi and Madras.

The total estimated supply of raw hides in India is about 200 lakh pieces. Of this, nearly 40 lakh pieces or 20 p.c. are exported raw or after tanning. The remaining 80 p.c. are consumed by small and large tanneries for preparing leather suitable for different types of articles used in the country. About 37 million pieces of skin are obtained annually from goats and sheep.

Indian hides and skins are purchased by the U.S.A., West Germany, U.K., France, Belgium, Iraq, Iran and Burma. India's capacity to export hides has become limited because of the partition.

Dairy and Milk Supply

In spite of large cattle population, per capita availability of milk is low in India. The total output of milk in India is about 24 million tons. More than 50 p.c. of the milk is obtained

from buffalo and 45 p.c. from cows. India stands second in the volume of milk production, her output being exceeded only by the U.S.A. Her milk production is over four times the output of Great Britain, over five times that of Denmark, over six times that of Australia and over seven times that of New Zealand. The yield of milk per head of cattle in India is very erratic ranging between 5 and 17 lbs. per day. With a little attention this can be raised to 15 lbs. per day per head of cattle.

U.P. contributes about 20 p.c., followed by Bihar (12 p.c.), Tamil Nadu (10 p.c.) and Maharashtra (6 p.c.).

The average consumption of milk per head per day ranges from 1.3 ounces in Assam to 16 ounces in Punjab.

Of the total milk produced in India, about 38 per cent is estimated as being used for consumption as fluid milk, about 42 p.c. for ghee and the rest for khoa, butter, curd and other products. The progress of dairy industry in India has been very slow on account of scattered and small-scale milk production, inadequate transport facilities in most parts of the country, dependence for long on imported plant and machinery for milk processing and shortage of technical personnel.[9] The dairy development activities in India are now being pursued with vigour in a number of places. The main problem of dairy is to keep markets remunerative for producers and to supply milk to consumers at reasonable price. There are programmes for expanding milk supply schemes, organising milk collection through primary co-operative milk societies and setting up of rural dairy centres. Maharashtra has made remarkable progress in dairying. At *Anand* in Kaira district in Gujarat a large butter factory has been started with a capacity of 10,000 lbs. of butter a day. Its tinned butter has a market throughout the country. Modern dairies have been set up in Delhi, Poona, Kudgi, Kurnool, Guntur, Kodai Kanal and Haringhata. Milk product factories are located at Amritsar, Anand, Mehsana and Rajkot. In U.P. there are dairies at Aligarh, Kanpur, Lucknow, Banaras and Allahabad.

[9] Most of the equipment today is now being made in India. There are six centres (Karnal, Bangalore, Aarey, Allahabad, Anand and Haringhata) which provide facilities for imparting training to dairy personnel.

Ghee has considerable demand in India and is used in the preparation of food and sweetmeats. Buffalo butter gives greater yield of ghee than that of cow. The ghee-producing areas are the U.P., Rajasthan, Madhya Pradesh and Punjab. The annual production of ghee in India is about 14 million maunds.

The seasonal variation in the quality of ghee is always noticeable. The best ghee is produced during the winter while the ghee produced in the rainy season is of inferior quality. Cheaper and inferior fats are often mixed with ghee.

Of the total ghee production, nearly 30 per cent is retained by the producers for domestic consumption and the rest is marketed. Ghee is also sent to Malaysia, Ceylon, South Africa, Mauritius and Hong Kong where a large number of Indian emigrants have settled. India also imports in normal years about 66,000 maunds of ghee, mostly from Nepal.

The Fourth Plan has its objectives to increase the supply of protective foods such as milk, milk products and meat; to improve the output of certain animal products of commercial importance such as wool, hides, skins, hair and bones; to diversify the economy of the small farmers by enabling them to undertake animal husbandry activities.

Poultry. Poultry development gives a substantial source of supplementary food for the nation, a gainful subsidiary occupation for a large section of the people and rural employment, especially among educated farmers. Poultry production has tremendous potentialities in India because of (*a*) the efficiency with which poultry converts foodstuffs into human food, (*b*) the small investment required to get it started, (*c*) its suitability as a family enterprise, (*d*) the small area required and (*e*) quick financial returns. The importance of poultry in India may be judged from the fact that, domestic consumption apart, it is estimated that 60 per cent of hen-eggs and 80 per cent of duck-eggs are sold every year to the value of Rs. 5 crores, the value of birds themselves being estimated at Rs. 7½ crores. The average indigenous hen produces about 60 eggs per year in India, as against 120 in many other countries. A factor in poultry development is the loss which the poultry breeder frequently suffers from the outbreaks of diseases. A large proportion of

the eggs produced during the hot weather are lost on account of the lack of proper preservation including cold storage. Regional poultry farms are being set up in Delhi, Himachal Pradesh, Bangalore, Bhuvaneshwar, Bombay and Poona. With the development of technical know-how in the country, there is no reason why India should not increase the poultry production many times more.

9. The Fisheries

With about 4,300 km of coastline and several million hectares of inland waters, India's fishery resources are large. The importance of fishing lies in the immense potentiality of that article in the food resources of this country. Notwithstanding the prevalence of vegetarianism, a large number of people of every caste and creed in India are accustomed to use fish in their daily diet. As a source of food, fisheries stand almost equal to agriculture and animal husbandry. When land cannot produce enough to feed a country's population, its water must be exploited in an effort to find more food.

The chief sources of supply are the coastal margins of the sea, river, estuaries and backwaters for marine and estuarine fish, and rivers, canals, tanks, inundated tracts etc. for freshwater fish.

Although the maritime and riverine fisheries at present occupy a very minor place in the national economy of India, the industry contributes about Rs. 60 crores annually to the national income. About 75,000 fishing crafts which ply along the country's extensive coastline provide work for about 1 million fishermen.

PRODUCTION AND DISPOSAL OF FISH

(In thousand tonnes)

	Total catch and landing	Fresh Marketing	Cure
1963	1,046	705	282
1964	1,320	924	287
1967	1,400	963	275
1969	1,800	979	310

The requirements of the fish-eating population in India are estimated at 4.5 million tons. The present production, therefore, falls short of demand by about 60 per cent. The gap between production and requirements is substantial because of the low level of exploitation of the country's vast resources in fisheries. Fortunately, however, the Bay of Bengal and the Arabian Sea are rich enough to meet this requirement. The potentialities for the development of fisheries in India are great. The exploitation has been delayed because of the absence of adequate mechanised fishing crafts. Also, much time is taken to return from the fishing grounds.

At present *marine fisheries* are carried on within 10 fathoms in the sea, and is confined to the coastal waters from the shore in Gujarat, Canara, Malabar Coast, Gulf of Mannar, Tamil Nadu Coast and the Coromondal Coast. The greater depths beyond the 100 fathom line are almost barren from the standpoint of commercial fisheries. The unsuitability of the vessels, limitations due to climate, absence of suitable harbours and the lack of refrigeration, transport and marketing facilities are serious handicaps in the way of the development of the marine fisheries of India. The fishing season for the marine fisheries lasts for about five months from September to January. Most varieties of fish caught along the coasts are edible. The principal catches are herrings, mackerel, prawns, Jew fish, cat-fish, mullets, pomfrets and Indian salmon. Mackerel accounts for over a third of the total catch and is found chiefly in the west coast of Tamil Nadu, Kerala, Maharashtra and Gujarat. Herrings account for over 15 per cent of the total catch. Prawn occupy the third rank with 9 per cent. Pomfrets, mullets and the Indian salmon, although very popular, are caught only in comparatively small quantities, the respective percentages being 1.7, 1.9 and 1.3. The type of fishing implements includes drift nets, cast nets, stationary nets, etc.

The Deltaic fisheries are confied to the estuaries, backwater areas, lagoons etc., and generally constitute very rich potential fisheries. While the fisheries in some areas, such as the Chilka Lake in Orissa and backwaters in Tamil Nadu and Kerala are extensively exploited, those on the extensive deltaic area of the Sundarbans and the delta of the Mahanadi are hardly tapped.

The backwaters of Kerala covering about 300 square miles offer excellent grounds for development of estuarine fish-farming for rapid-growing species of mullets, bhetki, pearl spot etc. The estuaries of the Mahanadi and the Ganga stretching from Puri to Hooghly contain cock-up, hilsa, pomfrets, prawns, catla, cat fish, rohu, etc., which are caught by trawl-type nets, drift nets and gilling nets, casting nets, bag nets, etc.

The river fisheries at present constitute the mainstay of inland fisheries of the country and are carried out in rivers, canals, irrigation channels, tanks, ponds, etc. The extensive expanses of the Gangetic system in the U.P., Bihar and West Bengal, the Brahmaputra in Assam, the Mahanadi in Orissa, the Narmada, the Tapti, the Godavari, the Krishna and the Cauvery systems are the main areas. West Bengal leads both in availability of fresh water fish as well as in value with 29 per cent and 36 per cent respectively. Bihar is a close second and Assam third in regard to the available surplus and the three States of West Bengal, Bihar and Assam account for nearly 72 per cent of the total freshwater fish marketed in India. Tamil Nadu, the leading State in the production of sea-fish, catches only 4.7 per cent of the Indian total so far as freshwater fish is concerned. The Mahanadi in Orissa and the Ganga and its tributaries in U.P. yield 8.3 and 3.8 per cent respectively of the Indian total.

The great problem that lies in the way of developing the fish industry in India is that people are accustomed to the consumption of certain varieties of fish. Wide publicity and propaganda are necessary to enlighten the people as regards the nutritious value of fish not consumed at present. The average *per capita* consumption of fish in India is 4 lbs. per annum, West Bengal being the leading consumer having 6 lbs. per capita consumption. In the Punjab, it is 0.9 lbs. and in Bihar, 1 lbs. One half of the total production is consumed as fresh fish: one-fifth is cured by salting, another one-fifth is simply sun-dried, while about 10 per cent is converted into fish fertilizers.

Development of Fisheries in States

Andhra and Tamil Nadu with a coastline of 2,050 km make fishing ground in the shallow water area of 60,000 square km.

There are about 250,000 fishermen in Tamil Nadu who had a nually 73,000 metric tons of sea-fish. The estimated landi of inland fish is 40,000 metric tons. Country boats are engag in catching sardine, mackerel, Jew fish, ribbon fish, etc., in t shallow waters around Ganjam, Gopalpur, Vishakhapatna Nellore, Madras, Pondicherry and Negapatam on the east co and Kozhikode and Mangalore on the west coast. Deep-s fisheries are being slowly developed in Tamil Nadu.

Kerala with a coastline of about 400 km aises more th 20 per cent of the total sea-fish landed in India. The ma catches are sardines, mackerel and prawns. rther exploi tion of the fisheries' resources of the sea off erala is bei carried on under an Indo-Norwegian project. The coastli as well as the existence of a number of tanks ha made *Myso* an important area for fish production. The production from t sea coast in Mysore is about one-seventh of India's total.

The annual quantity of sea-fish from the sea coast arou West Bengal and Orissa comes to about 577,000 maunds. T kinds of sea-fish caught are pomfret, bhetki, prawn, tap chanda, ribbon, skate, etc. If proper attempts are made, t Bay of Bengal can yield large quantities of high-class fish. T State's annual requirements of fresh water and sea fish are abo 10 million maunds, but the supply at present does not exc 700,000 maunds. Calcutta alone needs 6,500 maunds dai Orissa supplies a large quantity of sea-fish to West Bengal.

Maharashtra has a coastline abounding with excellent ha bours for fishing craft, a fair weather season lasting for so seven months, and a fishing population more alive to th opportunities and more daring than those of Kerala a Gujarat. The important varieties of fish caught along t coastline are pomfret, jew fish, Indian salmon, mullet, macke and sharks. The important fishing grounds are along the coa of Great Bombay, Surat, Broach, Ratnagiri and Canara. Fa lities exist at several places for curing, storage and refrigeratio

The coastline near *Gujarat* abounds in sea fish like po frets, prawns, Jew fish, Indian salmon etc. Veraval in Junaga is to develop fishing facilities by deepening the creek and co tructing wharf walls for fishing vessels to be anchored easily.

Bhopal has a great scope for the development of fisheries. *hopal's three main rivers—the Narmada, the Baitwa, and the irvati, with their tributaries, constitute the chief sources of fish. lso there is a large number of perennial and semi-perennial nks, which can be utilized for raising fish.* In Orissa and ssam, reclaimed marshy areas can be a good source of fresh-ater fish. Paddy-cum-fish culture is practised in Kerala, Tamil adu, Andhra and in some parts of West Bengal.

Some Problems in Fisheries

There is practically no fish-canning in India, and the fficulties of developing this industry are the absence of regular pplies of fish, lack of good and cheap containers and the short nning season. In India fish is preserved by desiccation with · without salt and by the use of antiseptic preservatives such brine, vinegar, etc. The fisherman in India practise desicca-on by drying fish in the sun as the process is simple and ndy. During the monsoon when sun-drying is difficult, salt is d. *Canning* is the best method applied for preserving rdines, mackerel and prawns and is practised on a limited ale in Madras and Bombay. The fish are beheaded and roughly washed after which they are put in saturated brine d then dried. In the last stage, the fish are packed in cans led with oil.

Mechanisation of fishing crafts has been introduced to a rtain extent in Tamil Nadu, Kerala, Mysore, Andhra and rissa. As fish is a highly perishable commodity coupled with ie fact that the climate, too, is sub-tropical, the need for ice-ld storage, processing and canning is great. At present ause of the transport difficulties, the fresh fish is consumed in as located near the coast or in the neighbourhood of landing aces. Refrigerated railway wagons and freezing facilities for overment of fish in good conditions to consuming areas will sure a balanced relationship between demand and price. The overnment of India has set up a claim of well-equipped pilot hing stations along the coast of India. Stations are located Mangalore, Bombay, Cochin, Vishakhapatnam and Port Blair. ach station has cold storage facilities and refrigeratory motor ns for carrying fish to inland market by road. The construc-

tion of fishing harbours is in progress at Porbunder, Bhatkal, Cannanore, Tuticorin and Cuddalore.

One of the aspects of fisheries development in India is th formation and running of fisheries co-operatives for preventi exploitation by middlemen, removing the indebtedness of fishe men and increasing production. Fishermen do not generall own boats, nets and other fishing equipment. The middlem who provide these requisites take as much as 50 per cent o the net sale proceeds from the fishermen as charge on hire There are now about 2,100 co-operative societies mostly i Maharashtra, Gujarat, Kerala, Tamil Nadu and Andhra Pra desh. With the craft now in use, the activities of fishermen ar confined largely to a coastal belt of about 10 to 15 km so tha fish resources farther away or in deeper waters are exploite only to a very limited extent. It will be possible to increas the production in off-shore water, if fishing methods are im proved and the fishing craft mechanised.

The lines of development of fisheries have been as follows (*a*) expanded mechanisation of existing fishing craft; (*b*) intro duction of new types of coastal fishing craft; (*c*) commercia fishing on the high seas by modern vessels; (*d*) installation adequate shore facilities for storing, freezing and processing fish; (*e*) improved methods of fishing in deep inland waters (*f*) fisheries co-operatives; (*g*) fish transport by rail; (*h*) im proved marketing; and (*i*) establishment of canning, fish-me and ancillary industries. Suppliers of synthetic yarn and twin should also be made available to the fishermen so that the can make improved types of nets.

Certain industrial products are also obtained from fish India. There are fish-oil, fish-meal, fish-manure, fish-maws a shark-fins. Tuticorin in Tamil Nadu has always been t centre of pearl fishing industry in India. There are two types oysters which are sought after for pearls; the *window-pan* oyster whose shell is used for decorative purposes, and the t pearl oysters. Window-pane oysters are found in the open off the Coromondal coast, Tamil Nadu coast and Cochin co The waters of the gulf dividing Indian Union from Ceylon of the Arabian Sea near the edge of the Kathiawar penins

as well as of the Gulf of Cutch, are rich in oyster beds, yielding highly valuable pearls.

There is an export trade in preserved fish to Ceylon, Burma and countries in the Far East. Tamil Nadu and Kerala are the chief exporting areas. Ceylon is the principal buyer, the average of her share being 80 per cent, followed by Burma. The importers of frozen and canned prawns are U.S.A., Australia, U.K. and Canada. The value of fish exports in 1969-70 was Rs. 42 crores.

The main objective of the Fourth Plan is to increase fish production to meet protein requirements and further develop the export potential. The Fourth Plan envisages an increase of marine production by 0.44 million tonnes and of inland fish production by 33,000 tonnes. The programmes provide for production and supply of fish seed, reclamation of derelict water areas for fish forming and development of reservoir fisheries.

10. Mineral Resources

Of the various minerals found in India, the most important are coal, manganese ore, gold, mica, iron ore, and salt. She is the world's main source of supply in ilmenite, monazite and zircon and mica. The mineral resources of the Indian Union encompass a sufficient range of useful products that are required to make a country industrially self-contained. With regard to non-ferrous metals like tin, lead, nickel and zinc, the country is not self-sufficient as she has to depend on other countries for about 75 per cent of her requirements.

Minerals are classified as essential, strategic and scarce in terms of their importance and quantities available. Minerals like coal and iron are considered *essential* because of their vital role in the industrial development. Minerals which are important for developing industries from the point of view of political safety against attacks and invasion, are *strategic minerals*. There is not much difference between essential and strategic except from a particular point of time. *Scare minerals* are those which are important but have limited supplies.

Considering the size and population of the country, the mineral wealth is not so vast as is supposed to be. India's position with regard to supply of minerals is as follows: —

(I) Minerals in which India can have large exportable sur-

plus are iron ore, titanium ore and mica. In all these minerals, India once dominated the world market. In view of the increased demand within the country in recent years because of industrialisation the volume of export has declined.

(II) Minerals of which the export can form an important factor are: manganese ore, magnesite, bauxite, silica, corundum, monazite, steatite, beryllium, natural abrasives and refractory minerals.

India is the principal source of monazite which is essentially a phosphate of cerium and contain a small percentage of thoria. Monazite is found in the sands all over the beaches of Kerala. As rains erode the rock in the Nilgiris and other adjacent hills, the particles are moved and washed into the ocean as sands. Some of these sands as a consequence of a peculiar force of sea currents are swept back and deposited on the beaches. Monazite, ilmenite, zircon, garnet and silmenite are obtained from such sands. Monazite sands can be processed to yield thorium, cerium, and other rare earths which India has been importing for use in various industries, such as the gas-mantle industry and metallurgical operations for manufacture of special flints, aluminium base alloys, etc. Traces of uranium, used in the production of atomic energy, may also be present in monazite sands. The Government of India has started a factory at Alwaye (Kerala) to work monazite for thorium and uranium. For strategic considerations India does not encourage her export for monazite.

(III) Minerals in which India may be considered self-sufficient:

Coal	Gypsum
Cement materials	Glass sand
Gold	Borax
Chrome ore	Pyrites
Building stones	Nitrates
Marble	Phosphates
Slate	Zircon
Mineral pigments	Arsenic
Industrial clays	Barytes
Sodium salts and alkalis	Precious and semi-precious
Limestone and Dolomite	stones
Tungsten	Vanadium

(IV) Minerals in which India has to depend largely or entirely on foreign imports:

Silver	Molybdenum
Nickel	Platinum
Petroleum	Graphite
Sulphur	Asphalt
Lead	Potash
Zinc	Fluorides
Tin	Antimony
Mercury	Copper ore
Asbestos	

Deficiency in Base Metals

India's position with regard to the position of *base metals* like copper, lead, zinc, tin, nickel and antimony is extremely unenviable inasmuch as in all these metals she is dependent on foreign supplies.

The production of lead ore in the country is not sufficient for her requirements. Normally India requires about 30,000 tons of lead while the production is hardly 4,000 tons. Lead is therefore to be imported from Australia, Burma and U.K. The principal lead mines in India are in Udaipur and Jaipur, both in Rajasthan. Lead ore reserves are estimated at about 11 million tonnes.

India requires nickel for engineering and chemical industries. Unfortunately, however, there is not a single nickel mine in this country nor is there any possibility of getting this material immediately. India normally imports about 1,000 tonnes of nickel most of which comes from Canada. In future however, nickel mines may be developed in Manipur, Kashmir and Bihar where deposits are known to exist.

India consumes about 10,000 tonnes of tin annually in the electrical goods industry, the metal container industry and the pharmacutical industry. At present there is no tin mine in India and the entire requirements are met by importing tin from Malaysia, Singapore and other countries. The feasibility of putting up a tin smelter based on imported concentrates from Thailand, *Indonesia and Malaysia is being considered.*

India produces zinc concentrates from the Zawar mines of Udaipur district, Rajasthan. In the absence of a zinc smelter in India, zinc concentrates are sent to Japan for smelting. India imports about half a million tons of zinc a year. In 1967, India produced 10,000 tons of zinc concentrates.

Conservation of Minerals. Many of the minerals like manganese, mica, chromite, refractors, etc., are worked solely for the purpose of export. In the drive to earn more foreign exchange, the minerals have played a significant role. The value of mineral production in 1970 was a little less than Rs. 340 crores. India earned about Rs. 90 crores in 1969 from the export of coal, iron ore and ores of non-ferrous base.

Not only do the existing mines contain sufficient reserves, there are also a large number of fields which can be developed. Nevertheless, the rapid industrialization of the country will result in the shortage of certain minerals in the near future unless new fields are discovered. Since it is the policy of the Government to see that the mineral wealth of India is utilized for the benefit of Indian industries, control of the unrestricted export of raw manganese ore, chrome ore, mica, titanium ore, phosphatic materials and refractory materials in general, as well as a better adjustment of minerals, export and import tariff are the measures in our planned economy of the nation's mineral wealth. Measures for conservation include avoidance of waste in mining and processing, and the substitution of scarce materials by those which are abundantly available in the country.

Iron Ore. The value of an iron ore deposit depends not only upon its richness in iron, but also upon its location and the ease or difficulty of mining. India is fortunate in this respect because most of her iron-ore fields are found within easy reach of coalfields. Dolomite and limestone necessary for smelting are also found in the neighbouring areas.

In 1969-70 the production of iron in the Indian Union was 29 million tonnes compared to 11 million tons in 1960.[9] The output is influenced by the demand of the iron and steel industry.

[9] The production of 1969 was on the basis of iron ore contents to the xtent of 60 per cent and above.

There are four different types of iron ores in India—magnetite, laterite, clay iron stone and haematite. The haematites are the most valuable iron ores in India, and both in quantity and quality they exceed any other ores of the same kind including the great American occurrences.

The most important iron ore fields are confined to Bihar and Orissa. The less important areas are in Madhya Pradesh, Tamil Nadu, Mysore, Maharashtra and Goa.

Orissa raises about 36 p.c. of India's total iron ore. Mayurbhanj contains large deposits of high grade iron ore in three principal fields—Gurumahisani, Sulaipat and Badampahar. The most valuable deposits occur in the chain of hills extending over 450 km from Kompilai in Bonai to the neighbourhood of Gua

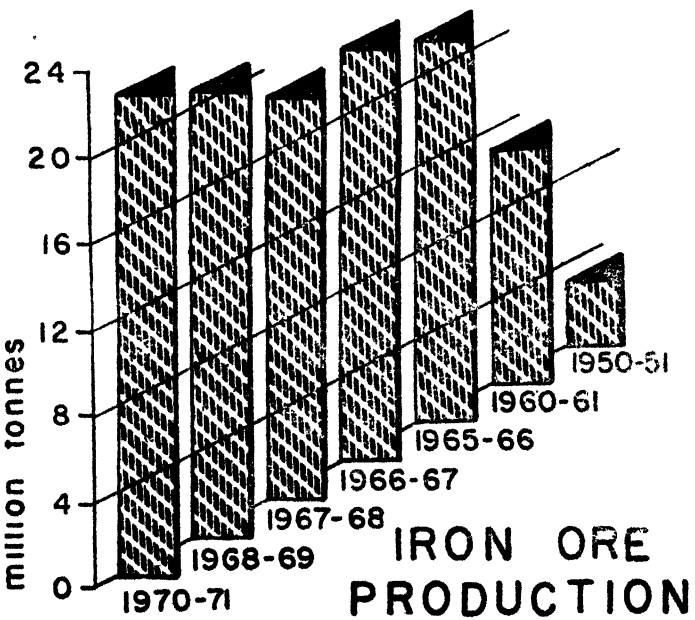


FIG. No. 88. Iron ore Production

in the Singhbhum district as in this area about 60 per cent of the total deposits of this belt are obtained. These three fields are all high lands and are connected by railway lines with

Jamshedpur, the centre of steel industry. These are also within easy reach of coal and dolomite fields and raise nearly one-third of the total Indian output. Kiriburu area is being worked for iron ore on a large scale and production has already started. The reserves of iron ore in the Kiriburu area are estimated at 173 million tons. Singhbhum is the largest iron-ore-producing area in India and rich deposits of high grade haematite occur in Pansira Buru, Gua, Buda and Noamundi, all in the Kalhan region. The iron contents of the ores in this area are greater than those of Mayurbhanj.

Keonjhar possesses two fields—one in the Bagia Buru ridge and the other on the north-eastern part which is really a continuation of the Noamundi mine of Singhbhum. Manganese and dolomite are also raised in the neighbourhood.

Madhya Pradesh is rich in iron ore which are now being exploited for the steel plant at Bhilai. The Dalli and Rajhara hills and Bastar hold out great possibilities. Bailadila iron-ore deposits are being developed with modern mechanisation for export to Japan and use in the steel plants of Bhilai ultimately.

In Mysore the main source of the ore supply is the Kemangundi field in the Bababudan hills. Iron ores are also developed in Donimalai in Sandur district, near Bellary[10] Ratnagiri district in Maharashtra holds out future possibilities. The Redi area in Maharashtra will soon give an annual production of 0.5 million tons of iron ore. Recently large deposits of iron ore have been discovered in Salem and Tiruchirapalli districts in Tamil Nadu. The quantity of ore has been estimated at 304 million tons at Salem-Trichinopoly. These fields can be developed for the erection of a steel plant in South India.

Iron ores reserves in India are much larger than the amount of coking coal available and therefore, India can spare large quantities for export.

The Fourth Plan envisages the demand for iron ore in 1972-74 of the order of 53 million tonnes, including 31 million tonnes for export. The production for export is to be met from

[10] The National Mineral Development Corporation, a public sector enterprise, is responsible for the development of iron ore mines in Kiriburu, Bailadila and Donimalai.

Bailadila (Madhya Pradesh), Bellary-Hospet (Mysore) and Goa. The production from Goa is anticipated to be about 8 million tonnes.

Exports of iron ore from India before 1949-50 were negligible. Since 1950, however, iron ore has occupied an important place in the exports. Iron ore is now one of the important sources of foreign exchange earnings to India. The entire exports of iron ore are at present canalised through the Mines and Mineral Trading Corporation. Of total current exports Japan alone accounts for more than 50 p.c. and the other customers are Poland, Yugoslavia, Hungary, Italy and East Germany. India earned Rs. 126 crores in foreign exchange from the export of 6 million tons of iron ore in 1969-70.

Manganese. India is a large manganese producer in the world. The reserves of manganese ore in India are by far the largest in the world. It has been estimated that of 180 million tons of reserves, about 40 p.c. are of marketable grade. A large part of the reserves is thus of poor quality.

The important areas of production are Orissa, Madhya Pradesh, Maharashtra, Mysore and Andhra Pradesh. Production of manganese ore in India in 1969 was 1.7 million tonnes. This output can further be increased immediately if demand position warrants it. Madhya Pradesh is the largest producer of manganese ore ; it is found in the Balaghat, Chindwara and Jabalpore districts. The State raises nearly 25 p.c. of the total Indian output. The industry has received great impetus from Vishakhapatnam which permits easy movement of the mineral to the port by the Waltair-Raipur railway line for exporting manganese outside.

In Maharashtra, large deposits of manganese ore are found in the districts of Nagpur and Bhandara. Maharashtra raises about 22 p.c. of the total production.

In Bihar manganese ores are found in Chotanagpur, mainly in Kalhan and Singhbhum. A small production also comes from Chaibasa. Although most of the Bihar deposits are of no economic value today, their nearness to iron ore districts and Jamshedpur will make them important in near future. Orissa normally supplies 22 to 25 p.c. of the total Indian production. Gangpur and Keonjhar are the two important areas in Orissa

for the supply of manganese. Bonai and Ganjam also produce this ore in good quantities. About 50 p.c. of the ore deposits of Orissa is low-grade. Balaghat and Chindwara in Madhya Pradesh have large deposits of manganese up to a depth of 500 ft. In Mysore, though the fields are widely distributed, the output is very small, being less than 1,000 tons, and it is raised in Chitradurg, Kadur, Shimoga, North Kanara, and Tamkur districts.

There is a steady rise in the consumption of manganese ore by the Indian iron and steel companies but the prosperity of the industry will depend on its ability to put the mineral on the world market at competitive prices. The Indian iron and steel companies consume hardly 700,000 tons a year out of the total production.

The manganese industry depends mainly on exports. In fact, manganese is a traditional item of our export trade. The principal buyers are U.S.A., Japan, U.K. and France. In 1969-70, India exported 1.1 million tons of manganese.

The difficulties in regard to export of manganese are (*a*) the competition from Ghana and the Brazilian exporters, (*b*) high costs, and (*c*) high rates of royalties from mining.

The U.S.A. is the biggest purchaser of manganese ore in the world, and takes nearly 50 p.c. of her total requirements from India. Ghana, Brazil, Egypt and South Africa are the competitors of India in the American market. In spite of the high cost of production, Brazil has the advantage of being located near the consuming centres which necessarily brings down the freight rates. In the case of India, apart from the problem of distance, the internal transport cost is comparatively high. This "coupled with the increase in the royalty rates has been mainly responsible for pricing out our manganese ore in the world market". There is urgent need for removing these difficulties so that the competitive position of India in the international market is strengthened.

Copper. Copper is usually found in combination with silver, gold, iron, lead and sulphur. It is extensively used in the electrical industries as a conducting medium as well as in the telephone and telegraphic equipment, in shipbuilding, in railways and in the production of alloys. In India copper is

particularly important for brass making and coinage. Till recently the prosperity of the Indian copper industry depended largely on the brass-making industry. With the introduction of aluminium products in the markets, the demand for brass goods has fallen considerably.

India's share in the world production of copper is very insignificant. The annual production of copper metal in India is about 10,000 tons as against the demand for 20,000 tons. Copper consumption in India is as yet very low compared to U.S.A., U.K. and other industrial countries. The *per capita* consumption of copper in India is 4 oz. whereas in U.S.A. it is 18 lbs. and U.K. 16 lbs.

There are three main copper belts, viz., Singhbhum in Bihar, Khetri and Daribo in Rajasthan and Agnigundala in Andhra Pradesh. A copper-bearing belt persists for a distance of some 125 km in Singhbhum where important fields like Mosabani, Ghatsila and Dhobani supply the major portion of the Indian output. The copper ores of Singhbhum are related to tongues of granite which intrude the schists. The ore occurs as veins in the granite and in the neighbouring mica schists, quartz schists and horneblende schists. The individual loads normally consist of one or more veins of sulphide varying in thickness from one inch to two feet, but the average is about five to seven inches. The average grade ore contains about two per cent copper.

Copper ore also occurs in Hazaribagh in Bihar, and Garhwal district in U.P. It has been estimated that Khetri area in Rajasthan alone has 28 million tons of reserves with an average copper content of 0.8 per cent. The Khetri-Kolihan deposits are in the public sector, and its annual production after the Fourth Plan is expected to be 31,000 tonnes of copper. Along the outer Himalayas, a belt of copper-bearing rocks runs through Kulu, Kangra, Bhutan and Sikkim, which are now difficult of commercial exploitation owing to the lack of adequate communications. The national highway connecting Siliguri with Gangtok in Tibet passes by the side of the Bhotang mine. The road is accessible throughout the year, but the mine is in a deep valley where the climate is extremely cold in winter.

Sikkim has about 350,000 tons of copper ore reserves with an average combined copper-lead-zinc content of 6.24 per cent.

India can hardly meet one-fifth of her requirements from internal supply of copper ore. The consumption is on account of electrial cable and wire industry, defence, railways and other industrial purposes. U.S.A. supplies about one-third of our requirements, followed by U.K., Canada, Chile and Belgium.

Gold. In the list of minerals in India, gold occupies the sixth place in value after coal, iron ore, lime stone, manganese and salt. But India's contribution to the world's total output of gold is less than one per cent. Gold is more widely distributed throughout India than any other useful mineral with the exception of iron ore. India raised about 3200 kilograms of gold in 1969.

In India gold is found in Mysore, Tamil Nadu, the Punjab, U.P., Bihar and Orissa. But the chief centre of gold-mining in the Indian Republic is the Kolar gold-field which is situated in the Kolar district of Mysore State. This field produces about 99 per cent of Indian gold. The Kolar gold-field is 60 km from Bangalore and lies on a high land 2,800 feet above sea-level *"where there is a single gold-bearing reef of quartz some four miles long"*. The field employs more than 23,000 workers. Sivasamudram, 135 km distant, supplies electrical power of the Kolar field. There are four principal mines in the Kolar field—the Champion Reef mine, the Ooregum mine, the Mysore mine and the Nundydroog mine. Champion Reef and Ooregum are among the deepest in the world, well over 9,000 feet. The production of the field is, however, on the decline. The Kolar gold mines have been nationalised. There are plans to extend the working of the Champion Reef mine to a depth of 11,000 feet and to explore the Mysore and Nundydroog mines to a depth of 10,000 feet.

In addition to the Kolar gold-field, some small production has been derived from the Bellara mine 95 km west of Bangalore, which has been re-opened by the Government of Mysore.

Not long ago the Raichur and the Dharwar district produced a fairly large quantity but these fields have now practically been closed down. Shortly, production on a small scale

in also be expected from the Hutti mine in Mysore where the quipment for the milling plant is now in course of erection. old deposits have been found in certain parts of Salem and hittur districts of Tamil Nadu.

Alluvial gold is found with sands in many rivers of India. . is recovered by the local inhabitants. Such areas are Singhhum in Orissa ; Ambala district in the Punjab ; Bijnor district i U·P., and the Brahmaputra valley in Assam.

Mica. India is the largest mica-producing country in the orld and produces more than three-quarters of the world's roduction. Indian mica is of muscovite type.

There is at present an enormous waste in the trimming and ressing of the crude mica. About 70 to 80 per cent of the ude mica is dumped as unmarketable refuse in the Hazariagh and Nellore mines. This waste mica is imported by the .S.A. where it is turned to fine powder for various uses in ectrical insulation.

The industry gives employment to about 32,000 persons. he aboriginal women and children who are generally employed i mica mines carry out the work with great skill.

Although mica is widely distributed, three principal areas ontrol its production and trade. These are (*i*) the Bihar belt, strip of country some fourteen miles broad and over 60 miles ong, running obliquely across the districts of Hazaribagh, aya, Monghyr and Manbhum, (*ii*) the Nellore district of ndhra Pradesh and (*iii*) Rajasthan. The production in 1969 f all varieties of mica was 18,000 tonnes.

The Bihar belt supplies more than 80 per cent of the Indian utput. Bihar mica is mainly of the ruby variety, the higher ualities of which, known as *clear and slightly stained,* are the nest in quality in the world and are greatly used in certain electrical industries. The Bihar belt is about 120 km long and the eposits are spread over an area of 2500 sq km. It runs in a eneral east-west direction along Gaya, Hazaribagh and Monghyr districts.

The Nellore district of the Andhra State raises mica by pen quarrying at Gudur, Kavali, Atmakur and Rajpur. The ields are in the coastal plain and extend for about 99 km. The Nellore mica has a greenish colour and is inferior to Bihar mica.

Rajasthan which raises more than 25 p.c. of India's production from Ajmere and Jaipur districts sends its mica to Bihar for splitting and marketing.

India earns between Rs. 15 and Rs. 16 crores a year from the export of mica. In 1969-70, India exported 24 million kgs of mica. The principal buyers of Indian mica are the U.S.A., the United Kingdom, Western Germany and France. The U.S.A. takes about 50 per cent of the exports. The indigenous consumption of mica in India is so low that the industry has to depend entirely on foreign markets for its prosperity. In addition to developing electrical equipment plants so as to use a part of the indigenous production of mica in the country, micanite factories and mica grinding mills will enable India to export finished products abroad.

The exports mainly go through Calcutta, Madras and Bombay. Calcutta alone handles 85 p.c. of exports while Madras and Bombay handle 14 p.c. and 1 p.c. respectively.

The imports of mica into U.K. from Canada and Brazil have recently affected the Indian trade. Today Brazil is not only developing as a competitor to India in international mica markets, but has also been seeking to process her mica in India.

Moreover synthetic mica, of which the well-known products are Pertinax, Bakelite, Paxolin and Formalite are competing with natural mica.

The future of the mica industry is bright. The advance of science has not yet been able to effect the importance of mica. If the cost of mica can be kept at a reasonable level, its demand will continue to increase. Mica Export Promotion Council which was set up in 1956 has been concerned with the study of the problems of Mica industry and its trade.

Salt. In India salt is mainly obtained from three sources—(*i*) from sea-water, (*ii*) from inland lakes and sub-soil water, (*iii*) from beds of rock salt. The chief salt-producing areas are Maharashtra, Tamil Nadu, Kerala, Andhra, and Rajasthan. More than two-thirds of the total production come from the sea-water of Gujarat, Maharashtra, and Tamil Nadu coasts. The West coast salt works include Rann of Cutch, Kathiawar and the coast from Surat to Mangalore. Dharsana and Chharvad on

the east of the Gulf of Cambay and Okha manufacture salt in large quantities. Normally the manufacturing season is from January to June. A considerable quantity of salt also comes from the brine of wells on the Little Rann of Cutch. The saline content of the water is very high; and the salt is produced by solar evaporation.

The salt-producing districts of the south-eastern coast of India extend from Ganjam to Tuticorin in the extreme south. Salt is also manufactured in the Udipi in Mysore. Tamil Nadu contributes more than 20 per cent of India's total production. 85 per cent of the production is consumed in the home State; the balance goes to Orissa, M.P., West Bengal and Mysore.

In West Bengal a few small-scale factories and cottage workers in the coastal districts produce salt from sea-water. The workers also produce salt by the artificial lixiviation process within scheduled areas of the coastal districts. Most of Bengal's requiremnts are met from the west coast of India and Tamil Nadu. Salt production in West Bengal can be increased by the method of solar evaporation is possible.

Another important source of salt is the sub-soil and lake brines of Rajasthan where there are many lakes. The reason for the high percentage of salt is that during the summer the south-eastern winds carry particles of salt from the Rann of Cutch and deposit them in this region, which are again washed into the lakes with rain water. Sambar is the biggest and the most ancient salt-field in India. At present only 60 p.c. of salt can be recovered from the available brine at Sambar field. The Didwana field produces a little more than 8 lakh maunds of salt a year. Rajasthan salt is mainly distributed to Punjab, Delhi, U.P. and Madhya Pradesh.

The average annual production of salt in India is 7 million tons in addition to 3,400 tons of rock salt. In India there is very little demand for salt for industrial purposes. About ourfifths of the requirements are for household uses. In the U.S.A. however, three-fourths of the requirements are for industries. The demand for salt in India, therefore, is likely to ncrease good deal with the advancement of the country and evelopment of its industries.

In India rock salt is available only in Himachal Pradesh.

The Geological Survey of India has started a detailed survey of the rock salt deposit at Mandi to estimate the salt reserves and to determine the quality of salt that can be mined economically in this site.

India attained self-sufficiency in salt in 1950, and export started from 1952. India exports salt to Japan, Indonesia and Nepal.

Saltpetre: Saltpetre has great industrial demand. It is used in the manufacture of glass, for food preservation and for manurial purposes in addition to its importance as a constituent of gun-powder. Bihar and Uttar Pradesh are the important producers. The main centre of manufacture is Furrukhabad in U.P. Nearly the whole of the output is exported but a small portion is retained in the country for the Assam tea-gardens. Saltpetre is exported to the U.S.A., the U.K., Mauritius, Ceylon and Malaysia.

Silver is obtained native and in combination with other metals, the chief of which are gold, lead and copper. Silver is used in India for the manufacture of ornaments, table utensils and coinage. India is by far the greater consumer of silver in the world.

Silver is obtained from the Kolar gold-field in Mysore and Manbhum in Bihar. Agnigundala in Andhra Pradesh, once an important supplier, does not raise it any longer.

The production of silver in 1969 was 2802 kilograms. India is just self-sufficient in silver. A small quantity is however imported from U.K., Belgium and Western Germany.

Chromite has considerable demand in the manufacture of ferro-chrome chromite steel and chromite bricks. This is also the source of chromium salt necessary for tanning and dyeing. The reserves of chromite have been estimated at 2.3 million tons.

Chromite occurs in Mysore, Bihar, Tamil Nadu, Orissa and Maharashtra. Mysore is the principal supplier of chrome and contributes nearly 35 per cent of the Indian output. Shimoga and Hassan are two main fields of Mysore where production is on the increase every year. The next important supplier the Singhbhum district in Bihar which raises nearly 12 p.c.

India's total ore. The other areas in Bihar where chromite occurs are Ranchi and Bhagalpur districts.

Practically the whole output is exported outside. The principal purchasers are the U.K., Norway, Sweden, West Germany and U.S.A. The shipment goes through Madras and Calcutta.

Indian chromite has its rivals in the European markets from Rhodesia and New Caledonia.

Antimony is a useful alloy for mixing with softer metals. Although India does not at present produce much antimony, the future possibilities for the development of this industry are great. Antimony ore deposits are found in Lahaul and Kangra districts. Considerable quantities may also be obtained from the Chitaldrug district in Mysore. At present about 500 tons of metal are produced by India from the imported ores which mainly come from U.K. Czechoslovakia, Iran, and Australia.

Tungsten or *wolfram* is used in the manufacture of hard steel and in the form of wire in electric bulbs. This metal ore occurs in Singhbhum in Bihar, the Marwar district of Rajasthan and in M.P., but these deposits are small in quantity. The annual consumption is probably in the neighbourhood of not more than 50 tons.

Gypsum is necessary for making fertilisers and in the making of certain kinds of paper. It is also used in India in considerable quantities in the cement industry. It can also be used as a source of sulphuric acid. Of late, its use as an insulator against heat and cold in modern buildings has become common. Commercial deposits of gypsum occur in the form of beds in sedimentary rocks and are found in Rajasthan, Punjab, Kashmir, Tamil Nadu and Gujarat.

By far the most important producer is Rajasthan where the mineral is found in Bikanir, Jodhpur and Jaisalmer. Rajasthan raises nearly 80 per cent of the Indian output. In Tamil Nadu the gypsum deposit occurs near Tiruchirapalli.

The production of gypsum from all deposits in the Indian Union in 1969 amounted to about 1.3 million tonnes.

Graphite is used for manufacture of stove-grate polishes and paints, as a lubricating agent for certain types of mchinery

and in making lead pencils. Up till now this mineral has not been commercially exploited to any great extent although its deposits exist in Kerala, Godavari district, Visakhapatnam, Orissa, M.P. and Ajmer-Marwara. The present production is 1,500 tons, as against the current consumption of 2,500 tons annually.

Asbestos is a silky fibrous mineral found usually in veins. It is used mainly in the manufacture of fibre-resisting materials. India raises a very small quantity of asbestos from the Bangalore district of Mysore, Ajmer-Merwara in Rajasthan, and Cuddapah district of Madras. India has to import every year large quantities of asbestos goods. There are, however, great prospects for an asbestos industry in India as the reserves are about 580,000 tons. The production was 9,000 tonnes in 1969 compared to 30,000 tons needed for internal consumption.

Diamond. Although the Indian diamond industry is the oldest in the world, its present output is insignificant. India produced 8764 carats of diamond in 1968.

Diamond occurs in the Anantapur, Bellary, Kistna, Guntur and Godavari districts of the south; Sambalpur district in Orissa; Chanda district in Maharashtra; and Panna district in Madhya Pradesh. There are two mines in the Panna district which are being worked under a public enterprise.

11. The Sources of Power in India

The sources of power in any country may be *irreplaceable* or *replaceable*. In India the irreplaceable sources are coal, petroleum and materials for nuclear power like uranium and thorium, while the replaceable sources are water power, wood, wind power and solar radiation. The principal sources of power now used in India, are coal, wood fuel, petroleum and water. Tidal power, wind power, geothermal power and solar radiations have not made much impact on electricity development in India so far.

The present pattern of commercial energy consumption is mainly dependent on coal. During the last few years, however, the relative importance of other sources like oil and hydel has been on the increase.

With growing emphasis on industrialisation and large-scale development of basic industries, utilization of power by different consumer groups has not gone up in the same proportion. Industrial undertakings accounted for 75 p.c. of the total power utilization in 1969 compared to 61 p.c. in 1951. The share of irrigation has increased from 3 p.c. in 1951 to 7 p.c. in 1969. Domestic and commercial consumption in respect of power has also gone up.

PATTERN OF UTILISATION OF ELECTRIC ENERGY CONSUMED IN INDIA

(In Million kwh)

	1960-61	1968-69
Industrial Power	12388	29755
Domestic	1492	2255
Irrigation	832	2670
Traction	453	1668
Commercial	847	2175
Total Energy Sales	16644	40770

In spite of the enormous development of power resources in India, the shortage is still felt in several States including U.P., Tamil Nadu, Bihar, West Bengal, Punjab, Andhra Pradesh and Mysore in view of the increasing demand from industris. In fact, the shortage of power has been responsible for the slowing down of the pace of industrialisation.

POWER PROSPECTS IN INDIA

There is no shortage of coal in the country, and the problem is mainly in regard to movement of coal and in raising coal. Extensive use of inferior grades of coal where they are available will stop avoidable movement of better grade coal from distant mines. In western and southern regions, the use of inferior coal for power generation will be of great value to industries. Indian forests are generally confined to hilly tracts from where transport is difficult and expensive. Nevertheless, the planned utilization of wood as fuel can assist in the improvement of certain areas. The production of petroleum in

India is still inadequate and, therefore, unless new fields are found, and developed, it cannot provide power on a large scale. There are oil refineries at Digboi and Gauhati in Assam, Barauni in Bihar, Cambay in Gujarat, Vishakhapatnam in Andhra, and in Bombay. In the near future India is likely to use nuclear power for generating electricity. The country has sufficient resources of tranium and thorium to develop this new source of energy. At Tarapur near Bombay a nuclear power station is being set up. Another nuclear power station is under construction at Rana Pratap Sagar in Rajasthan. The third nuclear power station will soon be established at Kalpakkam in Madras State.

As at present visualised, the power development in India will have to be dependent mostly on coal and hydro-electricity.

The pattern of power utilization in India is as follows: —

Andhra, Orissa	...	Mainly thermal
Madhya Pradesh ...	...	,,
South India ...	...	Largely hydro-electric
Maharashtra ...	...	,,
Bihar and West Bengal	...	Mainly thermal
Punjab and U.P.	...	Mainly hydro-electric

Coal. In India coal is the most important mineral product in respect of value and quantity.

India's coal industry suffers from a number of drawbacks. Indian coal is generally poor in quality; its fuel properties, that is, the percentage and condition of carbon content, are definitely lower than those of European or American coal. With the exception of Jharia coal, Indian coals have usually a high proportion of moisture. Again, the coalfields are very unevenly distributed. More than 98 per cent of the total output comes from one big belt—the Lower Gondwana coalfields (West Bengal, Bihar, Orissa, and Madhya Pradesh). The Peninsular India is very deficient in coal deposits and coal is totally absent in U.P. The transhipment of coal entails great difficulties in view of its bulk. Consequently, coal becomes expensive as a

source of motive power in industries if it needs be carried over long distances.

The coalfields are not situated either near the coast or in the valleys of navigable rivers. This distance of coalfields from the sea and from navigable rivers compels the Indian coal industry to look to railways for the movement of its products and the freight as a result is high.

Coal reserves in the Indian Union of different varieties up to one foot thickness of seams and within 1,000 ft. are 60,000 million tons which are mostly found in the Gondwana Basin. The total workable coal is estimated to be 20,000 million tons.

Of these reserves good quality coal is only 5,000 million tons. Whereas the reserves of non-coking coal in India are quite adequate for the country's requirements, the position with regard to coking coal is not satisfactory. At the current rate of output, the known reserves of metallurgical coal would last only for 70 years if no measures are taken to conserve them and if no new reserves are discovered. Nevertheless, developments in washing and blendings of Indian coals for coking purposes may result in extending the period to well over 150 years. It is estimated that out of 5,000 million tons of good quality coal, coking coal amounts to 1,500 million tons. This coking coal is exclusively confined to Jharia, Raniganj, Bokaro, and Giridih. At the present rate of increasing consumption the reserves may not last even 100 years.

From the point of view of utilization, the Indian coal can be divided into five groups :

(1) Coal suitable for metallurgical purposes : Such coal is found in Jharia, Raniganj, Bokaro and Giridih.

(2) High grade steam coal (both high volatile and low volatile) ; the sources are in Raniganj, Bokaro, Karanpura, Talcher and Singareni fields.

(3) Tertiary coal: Assam.

(4) Low grade steam coal.

(5) Lignites : Bikanir in Rajasthan and South Arcot in Tamil Nadu.

Geologically, the coalfields of India may be divided into two classes : (*a*) the Gondwana system of strata extending from Bengal, Bihar, and Orissa including Madhya Pradesh, and (*b*) the Tertiary beds found in Assam and Rajasthan.

Meghalaya in Assam contain large deposits of very high grade coal. The Central Government decided to undertake prospecting the area directly. The coal in these fields may rank among the best in the world. These fields when developed will make north-eastern region self-sufficient in coal, thereby releasing a large quantity for export. New coalfields have been discovered in Rewa, Pathakera, Korba and Bihar (Hutar). Investigations have revealed the existence of lignites in the Palana area

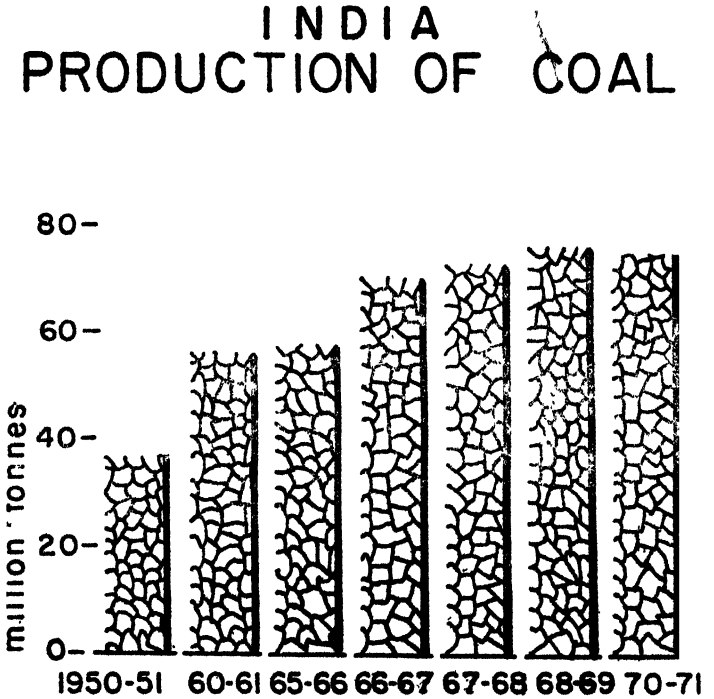


FIG. No. 89. India—Production of Coal.

in Bikanir division of Rajasthan. Recently the Geological Department has also discovered lignite deposits in South Arcot districts, covering an area of 16 square miles with 32 feet in thickness. This is perhaps the longest "find" in India. It has yet to be tested to what use this lignite could be put—whether for locomotives, or for extracting gas or synthetic petroleum.

New coal deposits have also been discovered by mining experts in the Daup area of the Nepal Tarai (the western districts of Khajawli and Soharatgarh).

In 1969-70 the production of coal was 80 million tonnes of which the private sector contributed as much as 55 million tons. The production of lignite in the same year was 4 million tonnes. The National Coal Development Corporation which was set up in 1956 to look after the production of coal in the public sector raised 25 million tonnes in 1969.

The requirements of coal in 1973-74 have been estimated at 93.5 million tonnes, of which the public sector is expected to raise 28·5 million tonnes.

Raniganj, the earliest coalfield to be worked in India, covers an area of 900 square km. It contributes about one-third of the total coal production in India. The Raniganj mines are the deepest in India and seams occur up to a depth of more than 2,000 ft. The Eastern Ry. with its branch lines serves the field. The coal production of Raniganj field in 1968 was over 30 million tonnes.

The Jharia field, 200 km. north-west of Calcutta, covers, an area of 995 square km. It is 24 km. west of Raniganj. More than 50 per cent of the Indian output comes from Jharia. Seams occur up to a depth of two thousand feet. The Eastern Railway serves the Jharia field. The abundance, accessibility and high quality of this coal-bed have made the Jharia field the most important in India. It supplies coal used in the industrial areas of the Ganga valley from Delhi to Calcutta. Jharia raises 20 million tonnes of coal a year.

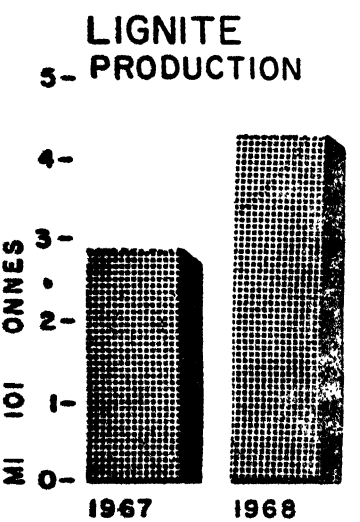


FIG. No. 90. Lignite Production

Close to the Jharia field to the west is the Bokaro field with an area of 320 square km. The North Karanpura field is very extensive and covers an area of more than 650 square km. Though it is not important today, yet in future it may become a great supplier of coal. North and South Karanpura raises more than 4 million tons of coal. The Bokaro field raises about a million tons of coal. The Giridih coalfield is a small one, but it yields some of the best coal to be found in India which is largely used in metallurgical industry.

In Madhya Pradesh, there are three fields—one in Sohagpur in Rewa, the second in the Pench valley of the Satpura region and the third in Umaria, near Katni. Sohagpur has an area of 2,200 square km and raises nearly 1 million tonnes annually. Recently a new coalfield has been located in the Korba area in Madhya Pradesh. The field is stated to cover about 300 square km divided into two sections each containing about 6 million tons of first grade coal per square km. In future, the railways may also be served with non-coking coal from the Korba coalfield to the relief of Bokaro fields. The Korba coalfield is being worked by the Government, and its production was about 2 million tonnes in 1968.

Maharashtra has now a number of fields in the Wardha valley, the centre being Ballalpur. In Andhra, the principal coalfield lies in Singareni, 210 km from Hyderabad city. "The coal itself is a dull, hard, non-coking, steam coal largely consumed by railways and mills in Southern India." Singareni fields raise about 3 million tonnes of coal a year.

Tertiary coalfields are worked in Assam and Rajasthan, and they supply nearly 3 p.c. of India's total output. Assam raises a little more than half a million tons of the tertiary coal from Nazira and Makum. Makum contains coal of excellent quality which is largely consumed by the railways, steamer companies and tea-factories in Assam. Rajasthan coalfields are located in Bikanir.

Consumption of Coal

Coal is used in India for the production of electrical power, for the running of railways, for propulsion of ships, for running other industries with steam power, for smelting purposes, for

such industries as glass, cement, etc. and for domestic purposes. A small quantity is used for conversion to gaseous fuel.

Railways, iron and steel and brass foundries consume more than half of the total available coal in India. Domestic consumption is as yet small although intensive propaganda is being carried on for the popularisation of soft coke as a domestic fuel.

At the present time, the demand for good quality non-coking coal is to the extent of 40 million tonnes. To this must be added the quantity of coking coal, now used for Iron and Steel Industry. The present demand for coking coal is a little above 20 million tonnes.

The Railways consume about one-third of the good quality non-coking coal produced in India. Since the reserves of non-coking coal are limited, the railways are likely to use in future the low grade coal as well as the thermal power from low grade coal. Steps are being taken for the use of electricity by railways in the suburban sections of West Bengal. Then again, there are many industries (other than cement, glass and ceramics) which make use of good quality coking coal though it is not necessary for them to do so. Some restriction on the use of such coal by industries is imperative.

The coal industry of India gives employment to more than 400,000 people who are mostly recruited from Chotanagpur, Madhya Pradesh and Bihar. Many of these labourers do not work in the mines throughout the year. In the agricultural seasons, they go back to their respective villages for working in the fields. This problem of periodical shortage of labour in the coalfields has been solved to a certain extent by the use of electricity in the mines for pumping and coal-cutting.

Out of total mines in India, three-fourths are so small that they cannot introduce mechanisation for coal cutting. Unless the smaller units, amalgamate, mechanisation will not be possible. As a result the output of coal per man per shift is comparatively low in India.

In spite of the large production of coal, many areas cannot get coal in time or in sufficient quantities because of transport bottleneck. Throughout the history of the coal industry its production capacity has been governed by transport availability. There is, therefore, need for doubling of railway lines over

certain sections and increasing the average daily supply of wagons to facilitate the movement of coal. On account of the inability of the railways to cope with the increasing volume of production, the coal industry often curtails its raisings by 3 to 4 lakh tons every month to prevent the accumulation of stock at the pitheads.

In addition to serious transport bottleneck and irregular wagon supply, the inadequate supply of power is also affecting production. The establishment of washeries is another urgent need of the coal industry. Many million tons of impurities move with coal, which, if washed, would reduce the burden of transport.

Though the current production is not sufficient for export, Indian coal has demand in Bangladesh, Ceylon, Burma and Singapore. In 1969 India earned Rs. 2 crores as foreign exchange.

The use of coal directly as a power is wasteful and uneconomic and can be avoided by converting coal into electricity. Besides, its conversion into electricity will permit the utilization of a number of by-products. "By electrification two-thirds of fuel consumed in industry and four-fifths consumed in colliery furnaces can be saved." Then, there is the problem of slack coal in India. Coal gets broken during mining operations. Thus a large part of coal in India is less than one inch in diameter. There is no market for this slack coal. Attempts are being made at *briquetting* the slack coal.

In future, lignite may greatly influence the location of industries. Although, it is a soft, low-grade coal, lignite can become an important source of raw material by transforming it into high grade temperature coke for metallurgical purposes. The reserves of lignite in and around Neyveli in the south Arcot district are estimated at 2,000 million tons. An integrated project has been undertaken for mining 4 million tons of lignite per annum.

Petroleum. Petroleum and its produce are very important for the growth and expansion of many industries in India. The products of petroleum are petrol, fuel oil, kerosene and lubricants for use in automobiles, railways, steamships, machines in manufacturing industries and others.

CONSUMPTION OF PETROLEUM PRODUCTS IN INDIA

(In 000 tons)

	1951	1970	1976 Estimated
Light Distillated ...	921	2,474	6,473
Kerosene ...	1,063	3,949	6,376
Diesels ...	717	4,791	8,848
Heavy Fuels ...	903	4,695	8,139
All total ...	3,982	18,778	35,131

The oil-bearing areas of India cover 1 million sq km. and include Assam, Tripura, Manipur, West Bengal basin, Himachal Pradesh, Kashmir, Rajasthan, Cambay-Kutch, Ganga Valley, Tamil Nadu coast, Andhra coast, Kerala coast and Andaman and Nicobar Islands.

The crude petroleum production has increased considerably between 1961 and 1970. In 1961, the production was only 269,000 tons while in 1970 it was 6.8 million tons. The production is likely to increase to 9 million tons in 1973.

Oil was first discovered in India at Makum in north-east Assam in 1867. It was not, however, possible to start drilling for oil before 1882 because of the lack of communications. The place that was selected to drill for oil was Digboi. The Digboi field in the Lakhimpur district of Upper Assam covers an area of $2\frac{1}{2}$ square miles and is the most important oil-producing field in India. The important oil centres are Digboi, Bappapung and Hansapung. In the Surma Valley some oil of poor quality is found in Badarpur, Masimpur and Patharia.

The oil-fields of Assam are connected with Calcutta by a direct railway link through Indian territory. The railway runs as far north as Sadya, a little north of Digboi. Digboi is connected by a branch line with Dibrugarh, an important river port. The second important oilfield is in Gujarat which has been raising roughly 2.7 million tonnes a year. The crude petroleum is sent to Trombay, near Bombay and Koyali near Baroda for refinery.

India's oil requirements are so rapidly increasing that the foreign exchange burden of importing crude oil has become

quite heavy. In 1970, India used 18 million tonnes of crude oil in the refineries—7.8 million tonnes in private sector and 10.2 million tonnes in public sector. She imported in the same year 9.6 million tonnes of petroleum. The value of imported mineral oils in 1970 was Rs. 96 crores. The main problem is, therefore, to discover and develop commercial reservoirs of crude oil to meet our need.

The Himalayan foot hills from Assam to Jammu, the marshy Sundarbans region of West Bengal, the Indo-Gangetic basin front of the Siwalik hills, the Cutch-Saurashtra-Cambay region and the coastal areas of Orissa, Andhra and Tamil Nadu on the east and Kerala on the south-west are being carefully investigated by the Oil and Natural Gas Commission for the exploration of oil.

Oil has already been discovered as a result of exploration work in Ankleshwar, Nawagam, Kalol, Kosamba, Sanand, Kathana, Dholka, Ahmedabad and Kadi structures in Gujarat and Rudrasagar and Lakwa structures in Assam. Natural Gas has been found in Jwalamukhi in the Punjab and at Mahuvej, Ghogha and Vadesar in Baroda. The gas reserves at these localities are thought to be quite considerable. The natural gas reserve of the Naharkatiya-Hurijan oilfields has been estimated at 481,000 million cu. ft.

The Government takes active interest in the development of oilfields in India, establishment of oil refineries within the country to work imported and indigenous crude petroleum and the distribution of oil and oil products. In all such activities, the Government secures the co-operation of private enterprises, subject to control and regulation.

There are at present three organisations under the Government to handle various aspects of oil industry—(*a*) *Oil and Natural Gas* Commission for exploitation and production, (*b*) *Indian Refineries Ltd.* for construction and operating the refineries and (*c*) *Indian Oil Company* for distribution and marketing of the petroleum products.

The Oil and Natural Gas Commission, set up in 1959, undertakes surveys and investigations to find out new oilfields. Foreign oil experts are invited to join in the search for oil in India on mutually accepted terms.

Petroleum is being refined in India by the Indian Refineries Ltd in the public sector and by a few foreign companies. The foreign companies have located their refineries in Bombay, Vishakhapatnam and Digboi. The two refineries in Bombay (Burma-Shell and the Standard Vacuum) have a refining capacity of 5 million tons of crude oil a year. These three refineries are being run according to agreements with India Government such as Exemption of Industries (Development and Regulation) Act and some duty concessions. All these refineries use imported crude oil as well as Indian crude oil wherever available. The selection of Vishakhapatnam as a site for the refinery by the Caltex Company was based on account of:

(*a*) the facilities of a fine harbour for handling ocean going tankers, (*b*) rail access by the South-Eastern and Southern Railways to provide for inland distribution ; (*c*) road access by means of the Grand Trunk Highway for local deliveries, and (*d*) the need for a new, major industry in this area.

The location of refineries at Bombay has several advantages like direct shipping routes between Bombay and the Persian Gulf coast for the import of crude petroleum, great industrial development all around Bombay, trnsport facilities by railways and roads to link different parts of India, and research and technological institutes within Bombay.

The Indian Refineries Ltd. have set up refineries at Nunmati near Gauhati (Assam), Barauni (Bihar), Koyali (Gujarat) and Cochin. The Nunmati Refinery produces almost the entire range of petroleum products: kerosene, petrol, high speed diesel oil, light diesel oil, furnace oil etc. and has a refining capacity of 1 million tons. This Refinery is a major step forward in the Government's plan to cater to the growing demand for petroleum products and also help make the country self-reliant in this vital commodity. The Nunmati Refinery was set up in collaboration with the Rumanian Government, and it went into production in 1962. The second State-owned refinery at Barauni (Bihar) was established in collaboration with U.S.S.R. Government and has a refining capacity of 20 lakh tons a year. The third public sector refinery at Koyali in Gujarat was started in collaboration with U.S.S.R. authorities and has 20 lakh tons capacity. Cochin has the oil refinery in the public sector in

collaboration with a U.S.A. firm. The Refinery commenced production in 1966. The Cochin Refinery has a capacity of 2·5 tonnes a year.

There is a network of oil pipe lines in India. The 250 mile long pipe line connecting Gauhati refinery (Nunmati) with the Naharkatiya oilfield is in operation. The remaining 470 mile long pipe line up to Barauni was ready in 1964. This pipe line system, traversing a difficult terrain, cutting across three State boundaries, is the second largest in the East. The pipe line is owned by the Indian Oil Corporation. There is also a pipe line between Haldia and Barauni.

The location of refinery at Barauni, though not an ideal one, has the advantage of nearness to the industrial regions of the north and railway connections with the eastern regions. The refinery at Gauhati is located on the bank of the Brahmaputra which is navigable throughout the year with regular steamer services to connect Calcutta. Gauhati is also a railway centre, the importance of which has increased because of the construction of a railway bridge at Pandu, 5 km from Gauhati.

The Indian Oil Company, the first company in public sector to undertake marketing and distribution of petroleum products in India, has its headquarters at Bombay. The entry of the Oil India Ltd. as a State enterprise in the distribution trade is a significant economic event. Oil India is the sole marketing agent for all products refined by the Gauhati Refinery and other public sector refineries. Its objectives are to obtain oil from Indian soil, or anywhere in the world; to buy where available to store where needed, and to distribute even to the remotest villages.

The fourth refinery is being set up at Madras with a capacity of 2.5 million tonnes. There is also a proposal to have a refinery in the Haldia region.

The recent development in the organisation of marketing and distribution of oil in the public sector is the amalgamation of the Indian Oil Refineries Ltd. and the Indian Oil Company to form a new company known as the Indian Oil Corporation Ltd. in 1964. The Corporation imports petroleum and distributes the products of the public sector refineries.

The Development of Hydro-electricity

India promises to be one of the leading countries in the world in the development of hydro-electric power. The great advantage of water-power is that in the process of power generation, people merely utilize the gravity of water and do not consume any substance.

Water-power schemes are, generally, difficult to construct in India, because the power needs to be continuous, while rainfall is seasonal. Costly storage works are indispensable. Fabourable sites for storage works exist in many parts of the mountainous and hilly regions where the rainfall is heavy. Hydro-electric schemes have developed in Maharashtra, Mysore, Kashmir, Tamil Nadu, U.P. and Punjab.

In the Western Ghats of Maharashtra, three earliest hydro-electric power stations are at *Lonavala, Nila Mula and the Andhra Valley*. The Lonavala works are situated at the top of the Bhor Ghats where rain water is stored up in three lakes, namely, Lonavala, Walwan and Shirawata from where it is conveyed by canals and pipe lines to Khopoli at the foot of the Ghats for generating power. The Andhra Valley Power Supply Company is situated at Bhivpuri on the Andhra river where a reservoir has been constructed by means of a dam across the river. To the south-east of Bombay on the Nila Mula river a great hydro-electric scheme was developed in 1927. All these three works have been developed through the enterprise of the Tata organisation of Bombay to provide Bombay, Thana, Kalyan and Poona with electricity for light, power, traction as well as numerous domestic and industrial applications. It has been estimated that hydro-electric potential of the rivers of the Western Ghats is 42 lakh kw. Some of the more recent projects that are under construction are Bhira, Koyna and Vaitarna in Maharashtra.

Southern India has developed, in recent years, hydro-electric power at various places. The total installed capacity of hydro-electric power in South India is about 230,000 kw. although 2 million kw. can be made available. Tamil Nadu has about half of these resources and the rest are in Mysore and Kerala. This power is in great demand in the villages of the South for lifting water from wells for irrigation purposes. The power is

also extensively used in Tamil Nadu, Kerala and Mysore for industrial purposes like development of electro-chemical and fertiliser factories, textiles, machine tools, aluminium etc. In future electrification of Southern Railways will make the area free from dependence on Northern India for coal to the extent of 1 million tons a year. The first hydro-electric scheme was given effect to in India in 1920 on the Cauvery river in Mysore with the object of supplying power to the mining-companies in the Kolar gold-fields. The power house is situated at Siva Samudram, 137 km. from the Kolar fields. At present power is transmitted not only to the Kolar gold-fields but also to Bangalore and to about 200 other towns of Mysore. In Kerala there is one hydro-electric station at Pallivasal which generates about 22,500 kw.

There are three important hydro-electric power stations in Tamil Nadu ; (*a*) *Pykara,* (*b*) *Mettur* and (*c*) *Papanasam.* The Pykara Hydro-electric Scheme was developed in 1932 on the Pykara river in the Nilgiri district. Power is transmitted to Coimbatore, Erode, Tiruchirapalli, Negapatam, Madurai and Virudhnagar.

The Mettur Hydro-electric Scheme is situated immediately below the Mettur Dam on the Cauvery. The Mettur Dam, one of the largest of its kind in the world, has been constructed mainly for irrigation, and part of the water let down for irrigation is utilised to the best advantage for the generation of hydro-electric power. The Mettur power scheme provides the districts of Salem, Tiruchirapalli, Tanjore, North Arcot, South Arcot and Chittur with energy. The Mettur scheme is linked with the Pykara works at Erode. Tamil Nadu has another scheme on the Tamraparni river at the foot-hill of the Western Ghats above Papanasam in the Tinnevelley district which supplies to Tinnevelley, Koripatti, Madurai, Tenkasi and Rajpalayam. In the matter of rural electrification, Tamil Nadu is the leader. About 2,000 villages receive electricity in Tamil Nadu. The textile mills, cement factories, steel works, aluminium works, paper mills, railway workshops, etc., use hydro-electric power in Madras.

The following hydro-electric power stations were commissioned in South India during the plan periods:

Andhra Pradesh : Nizamsagar hydro-electric scheme; Machkund Project; Tungabhadra;
Tamil Nadu: Kundah; Periyar;
Mysore: Jog power; Sharavathy;
Kerala: Poringalkuthu; Neriamangalam.

In Punjab the Uhl River scheme supplies 50,000 kw. power to the Railways and to several industrial towns like Amritsar and Ludhiana. The Uhl from which the power is generated is a small river. The transmission system serves all big towns lying in the belt between Gurdaspur and Ferozepore as well as Simla, Ambala, Patiala and Gujranwala. In the near future the supply will be extended to Saharanpur, Meerut, Delhi and districts of Karnal, Panipat and Rohtak. The scheme aims at providing industrial power and light to the towns of the Punjab and assisting agriculture in a number of ways by preventing water-logging and raising water to the required level on irrigated lands. The Nangal scheme gives 48,000 kw. of power. The Bhakra project supplies power not only to Punjab but also to Western U.P., Delhi and Rajasthan to the extent of 207,000 kw.

In U.P. hydro-electric installations have been open to supply power to agriculture and industries. The Ganga Canal in its course from Hardwar to Meerut passes over 12 falls which range in height from 10 to 15 ft. The government of the province made a scheme in 1926 to obtain energy from these falls and at present there are seven hydro-electric stations, situated as follows: Bahadurabad, Mohammadpur, Chitaura, Salawa, Bhola, Palra and Sumera. More than fourteen districts of the Upper Ganga area are served by these hydro-electric works. The Pathri hydro-electric scheme which was completed during the First Plan has the installed capacity of 20,400 kw. The Sarda Hydro-electric project at Banbassa, Uttar Pradesh, is one of the important development projects of the State and gives 41,000 kw. of power. Three other generation schemes are Matatila hydro-electric project, Jamuna hydro-electric project and Ramganga hydro-electric project which together will have total installed capacity of 477,500 kw. Rihand Project has 250,000 kw. capacity.

As a result of the development of hydel and thermal power stations in India, the installed capacity of generating plants has

gone up to 10,190 mw. This power is utilised in big industries, in the sector of small-scale and cottage industry, in irrigation and in village.

INSTALLED GENERATING CAPACITY OF ELECTRICITY

(1000 kw.)

	Steam	Oil	Hydel	Total
1951 ...	1,097	163	576	1,835
1961 ...	2,471	329	2,419	5,219
1964 ...	2,697	365	3,167	6,229
1967 ...	4,942	466	4,782	10,190
1970 ...	5,975	480	5,487	11,883

Thus, it is observed that the rate of progress has been most spectacular in the case of hydel power as compared to steam and oil.

12. Principal Manufacturing Industries and Industrial Areas

Within recent years, India has made tremendous progress in the development of manufacturing industries under Five Year Plans. Industrial development is being pursued both in the public and private sectors on a pattern of mixed economy. In addition to the expansion of the existing industries, a number of basic and capital goods industries like iron and steel, chemicals and fertilisers, heavy electrical and heavy machine tools etc. have been set up to obtain a balanced economic growth. Because of the rapid growth and diversification of industry, the past decade may be described as the beginning of industrial revolution in India.

The geo-economic forces like raw materials, power, labour, transport, markets and finance have influenced the location pattern in India. These bases or forces also explain the reasons for concentration of certain industries in definite areas. Industries which use raw materials in their primary stage in large quantities are usually located near the source of raw materials. This is because some of the raw materials lose their weight in the process of manufacture or cannot bear high transport cost or cannot be transported because of their perishable charac-

ter. Sea ports are generally preferred when the raw meterials are to be imported. The availability of raw materials in the neighbourhood is responsible for the concentration of jute mills in West Bengal, iron and steel in Bihar and Bengal, sugar factories in U.P., and cotton mills in Maharashtra, Gujarat and Tamil Naidu. The concentration of a number of industries in South India, Maharashtra, Bihar and West Bengal has been due to the development of electric power from coal or water in these regions. The availability of power, fuel and facilities for transport greatly determines the rate at which an industry can grow in India.

Today, in India, the three principal factors which have influenced industrial location are natural advantages relate to the availability of power and raw materials in the neighbourhood. The acquired advantages are on account of social and political considerations to make a region industrialised. The presence of large population along with effective demand also decides location.

Broadly speaking, the manufacturing industries in India may be classified under two groups from the viewpoint of planned development in the national interest: (*a*) those in the Public Sector and (*b*) those in the Private Sector.

Industries in the private sector cover a wide range of products like textiles, iron and steel, chemicals, paper, sugar, cement, glass etc. Indeed, the foundation for India's industrial growth in the immediate past was laid by the private sector.

The industries in the public sector are being run in one or other of the following manners: (*a*) as a Government Department, (*b*) as a Corporation (*c*) as an organisation under company law.

Some Important Public Sector Industries

Iron and steel	Rourkela, Bokharo, Durgapur and Bhilai (Orissa, Bihar, West Bengal and Madhya Pradesh)
Petroleum refineries	Nunmati (Assam), Barauni (Bihar)
Machine tools	Bangalore

Newsprint and paper mill	Nepa (Madhya Pradesh)
Salt ...	Samghar and Didwana (Rajasthan) and Kharaghoda (Maharastra)
Heavy Engineering .	Hatia (Bihar)
Frtilisers	Sindri, Nangal, Namrup, Trombay, Gorakhpur
Ship-building	Visakhapatnam
Aircraft	Bangalore
Heavy Chemicals .	Bhopal (Madhya Pradesh)
Cables for Telegraph .	Rupnarayanpur (West Bengal)
Antibiotics	Pimpri (near Poona)
D.D.T.	Delhi and Alwaye (Kerala)
Locomotives .	Chittaranjan (Bihar)
Electronic Equipment .	Bangalore

Areas which were formerly industrially backward have today excessive concentration of the Public Sector industrial investment. "Preference in fact has always been given to the location of public sector projects in relatively backward areas whenever this could be done without significant prejudice, to technical and economic consideration; and this will be the guiding principle for the future also." Even in the private sector projects, the claims of under-development regions are kept in view.

The extension of the public sector into fields requiring the establishment of large scale units and heavy investments, the encouragement for developing medium and small-sized units and the opportunities for new entrants in the industrial field are aimed at preventing concentration of economic power in the hands of a few entrepreneurs, and promoting a pattern of industrial organisation which will lead to high levels of productivity against the background of the goal of a Socialist pattern of Society.

"The broad objective of industrial development during the Fourth Plan is on the one hand, to provide for an adequate expansion in the supply of consumer goods, primarily those which cater to the needs of the mass of the people, and on the other, to expand the basic and heavy industries supplying the capital goods and intermediate goods at a rapid pace so as to achieve the goal of self-reliance as early as possible. Further

more, the industrial programme should provide, in accordance with high priority attached to agriculture, the expansion of capacity in industries which provide industrial in puts to agriculture." The Fourth Plan has thus prgrammes for (*a*) boosting exports and substituting domestic prouction for exports; (*b*) maximising agricultural production; (*c*) giving priority in industry to those sectors which contribute towards agriculture and (*d*) economising on expensive new projects and concentrating on completing those already begun.

Industrial Regions

Though manufacturing industries are scattered throughout the country, the principal industrial regions are as follows :

(1) The Damodar-Hooghly region covers the south-eastern Part of Bihar and the sourthern part of West Bengal. The industries are iron and steel, fertilisers, locomotives, jute, cotton, chemicals, paper, automobiles; glass, silk, aluminium etc. The chief source of power is coal.

(2) The Western cotton-belt region includes Maharashtra and Gujarat with industries like rayon, cotton, wool, paper, chemicals, glass, sugar, automobiles etc. in Bombay, Baroda, Ahmedabad, Surat, Poona etc.

(3) The Southern region, quadrilateral area covering Madras, Madurai, Coimbatore and Bangalore, is noted for cotton, silk, chemicals, sugar, iron and steel, glass, aricraft, telephone equipment etc.

(4) The Ganga-Jamuna region with Allahabad, Kanpur, Lucknow, Delhi for paper, cotton, leather, wool, glass, sugar and chemicals.

(5) The Central region with scattered centres like Nagpur, Jabalpore, Bhopal and Indore for textiles, cement, heavy chemicals, paper etc.

The Cotton Textile Industry

India is now one of the leading cotton manufacturing countries in the world; she is second in the production of cotton and third in the number of persons employed among the

countries manufacturing cotton. Indeed, the Indian cotton textile industry was the most significant example of national achievement in the industrial sphere and was a symbol of India's potentialities as an industrial country before the Independence.

In 1970, there were 650 mills of which 289 were composite. The total installed capacity was 175 lakh spindles and 2 lakh looms. During the same year mill cloth output was estimated at 7753 million metres and yarn output 961 million kgs.

Although cotton mills have wide geographical distribution, the three states of Maharashtra, Gujarat and Tamil Nadu have more than 350 mills, each having more than 100 mills. There are no cotton mills at present in Assam, Himachal Pradesh and Kashmir. Bihar has only 2 mills. West Bengal is fourth in rank in terms of number of mills with 40.

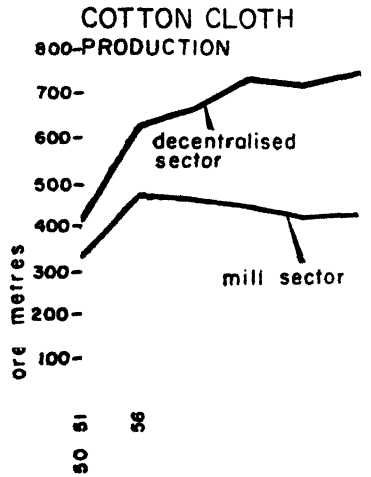


FIG. No. 91. Production of Cotton cloth.

The importance of the cotton industry can be judged from the fact that (*a*) it has nearly 12 per cent of the total paid-up capital of all joint stock companies in India; (*b*) next to tea and jute, foreign exchange earnings come from cotton; in 1970, the exports of cotton manufactures contributed about Rs. 93 crores towards foreign exchange; (*c*) it has 20 per cent of the industrial labour, the biggest in India. More than 850,000 labourers are engaged on daily wages. In addition there are more than 50,000 persons as technicians and managers. (*d*) It supports a number of ancillary industries like dyes and chemicals, mill stores and packing materials. "The value of such materials

consumed by the industry is roughly Rs. 41 crores per annum". (*e*) More than 1.5 million weavers in the handloom industry obtain their yarn requirements from the textile and produce 1.500 million yards of cotton a year.

Every year 20 to 30 new cotton mills come up, but 20 to 25 mills also remain closed every year in different parts of India.

The cotton mills industry consists of two sections—the spinning mills and the composite (spinning and weaving) mills. Although a certain amount of traditional separation in respect of yarn and cloth is still noticeable, the present tendency is towards integration.

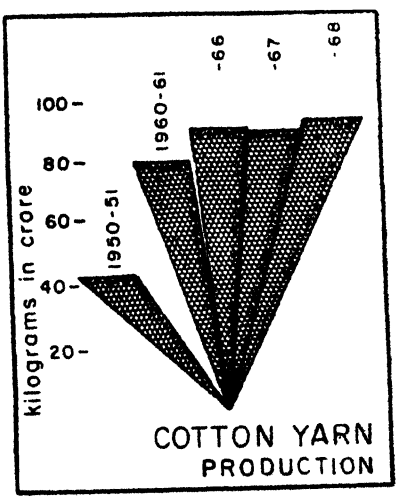


FIG. No. 92. Production of Cotton Yarn.

The lines of cotton manufactures consist of yarn and woven goods; and these supply more than 80 per cent of the country's requirement for mill hand goods. The woven goods are grey and bleached piece-goods, coloured piece-goods, hosiery, cotton goods mixed with silk or wool and miscellaneous. About 72 per cent of the cloth production is medium quality, 15 p.c. coarse quality and 13 p.c. fine and superfine.

Cotton Manufacturing Areas

Maharashtra and Gujarat have more than 220 mills, of which Bombay Island and Ahmedabad possess 65 and 78 mills respectively. Judged by the quantity and value of production, Bombay ranks first in the list of cotton manufacturing centres. Next to Bombay, Ahmedabad is the second largest cotton-manufacturing city in the country. In the State of Maha-

rashtra, the second centre is Sholapur followed by Poona, Yeotmal, Nagpur and Jalgaon. The size of the cotton mills in Bombay is usually large in view of the fact that the mills are public limited companies and have been in the market for long.

The localisation of cotton industry in the city and Island of Bombay has been governed not so much by natural and permanent factors as by capital and credit advantages, the presence of adequate means of communication and the fact of Bombay being a port. The vast capital which the members of the Parsi and Gujarati communities had acquired from export of raw cotton through Bombay in the eighties and nineties of the last century provided impetus to the location of cotton mill industry in Bombay. The climatic condition of Bombay is such that it favours the production of yarn of finer counts, but the preponderance of higher counts is a feature of the Ahmedabad cotton industry and not so much of Bombay. Again, Khandesh, Berar and Wardha, where raw cotton is grown, are nearer to Ahmedabad than Bombay. When the cotton textile industry was established, Bombay had not developed hydro-electricity and depended on Bengal for coal. The cotton industry in Bombay city draws its labour force mostly from the neighbouring districts of Konkan, Satara, and Sholapur. The supply of labour also comes from the Deccan and the Uttar Predesh.

In spite of these difficulties, Bombay is still the principal centre of the industry. The special advantages of Bombay are: (*i*) credit and banking facilities, (*ii*) the natural harbour. The cotton crop of the hinterland gravitates in large quantities to Bombay for export and so a special flow of cotton for the purpose of mills need not be created. The port also enables Bombay to import machinery and other requirements from U.K., West Germany, and U.S.A. with ease. *Bombay has combined the textile specialisation of Manchester with the commercial and shipping characteristics of Liverpool.*

The bulk of the cloth produced in Bombay City consists of light texture cloths made from medium count yarns. During recent years many Bombay mills have specialised on fine count cloths. Longcloth, shirting, T. cloths, domestic and sheetings

account for more than 50 per cent of the production, while the remainder consists of dhoties and coloured goods.

Ahmedabad is capable of producing almost any grey, bleached, woven coloured or printed cotton fabric in general demand. Her annual production exceeds 1,000 million yards of piece-goods. Ahmedabad also produces dhoties and saries on an extensive scale.

The plains of Berar and Nagpur lying to the west in the valleys of the Purva and Wardha rivers contain rich black soil which makes the area a great cotton growing one. The cotton mills in this region are located at Nagpur and Akola. From the point of view of labour employed, Nagpur is the most important cotton textile centre in eastern part of Maharashtra.

The Cotton Mill Industry in West Bengal has made good progress in the last twenty years. At present production is

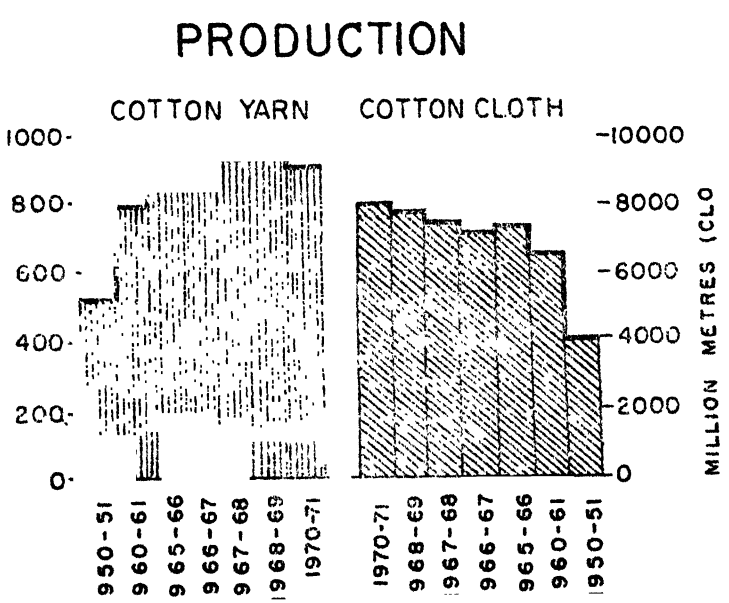


FIG. No. 93. Production of Cotton Yarn and Cotton cloth

mostly confined to grey and bleached goods with dhoties for home consumption predominating. There are now 40 cotton mills in West Bengal. The industry is located in three districts,

namely 24-Parganas, Howrah and Hooghly—all along the basin, within a radius of 45 km. from Calcutta. The Hooghly basin offers unique opportunities for the development of industries inasmuch as the area is served by a perfect network of railways and riverways. Calcutta, by bringing mill machinery and raw cotton from abroad, distributes them to the different cotton centres of the Hooghly basin. The economic advantages of Calcutta in being near to Jharia and Raniganj coal-fields, besides being itself a money and labour market, have influenced greatly the concentration of cotton textiles around the city. The mill centres are Sodepur, Serampore, Panihati, Shamnagar, Maurigram, Belgharia, Palta, Fuleshwar, Salkia and Ghoosery—all in the districts of Howrah and 24-Parganas. West Bengal is a great market for cotton goods in India. Moreover, the neighbouring states of Assam, Bihar and Orissa offer a vast market for the Bengal mills. The only problem is the question of raw materials in view of the fact that about 223,000 bales of raw cotton are consumed a year in West Bengal cotton mills. West Bengal is situated far from the cotton-growing areas of India. But then, the high price paid for raw cotton is compensated largely by the economy in the freight on coal

The cotton-manufacturing industry of Uttar Pradesh with 30 cotton mills is highly organised and employs 52,000 workers. Its disadvantages of being located far off from the coal-fields is counterbalanced by the presence of a large local market, cheap an efficient labour and excellent transport facilities. The cotton industry is particularly confined to the towns on the banks of the Ganga. *Kanpur is the most important cotton manufacturing centre,* and has now 17 cotton mills. The bulk of the labour force in the mills comes from the neighbouring agricultural areas. The cotton manufactures in the U.P. are yarn, grey and coloured piecegoods, hosiery and carpets. The U.P. produces about 250 million yards of cloth per annum, of which grey and bleached goods account for 95 per cent of the production. Cotton carpets are becoming important of late, and the centres of manufactures are Bareilly, Aligarh, Agra, Moradabad and Etawah. Tentage and *dosuti* fabrics are made in Kanpur.

The growth of the cotton mill industry in South India during recent years has been phenomenal. South India possesses

certain geographical advantages in respect of raw materials and power resources developed as a result of hydro-electric schemes. The rapid development of textile mills in the south was noticeable after 1932 when the hydro-electric supply was made available. Apart from the fact that the best staple varieties of cotton are grown in the region, the South has a large consuming market. The dispersal of the industry in the various parts of the region is on account of the location of hydro-electric units. There are about 189 cotton mills in the south including Andhra (15), Tamil Nadu (139), Mysore (21) and Kerala (14). The districts of Coimbatore, Madura, Tinnevelley and Ramnad are important zones. The cotton mills centres are Coimbatore (41 mills), Madurai (19 mills), Salem (4), Tinnevelley (4), Malabar (5), Madras, Guntur ; Bellary and East Godavari, Mysore, Trivandrum and Padukota are other centres. The mills are scattered over the different centres but the greatest concentration has been around Coimbatore. The availability of cotton in the neighbourhood, the plentiful local labour, the moist climate necessary for spinning and the facilities of transport by roads and railways have made Coimbatore one of the most important cotton manufacturing centres in India. The hydel power from the Pykara project is used extensively by the cotton mills at Coimbatore. The South Indian cotton mills concentrate mostly on spinning as about 16 p.c. of the total spindles of India are to be found here. Only 4 per cent of the total loomage of India is in South Indian mills. The spinning mills supply yarn mostly to the handloom industry for which South India is noted. "The mill industry in the South is so closely linked to and dependent on the handloom industry that vicissitudes of one equally affect the other." The handloom industry employs 12 lakh weavers as against 138,000 workers in the textile mills of the south.

Madhya Pradesh is an important centre of cotton manufacture in India with 20 mills and 44,000 daily workers. The cotton mills are located at Gwalior, Indore, Bhopal and Rajnandangaon.

Delhi with seven cotton mills specialises in the production of coarse count cloths and produces considerable quantities of dhoties and tentage materials and excellent upholstery and tapestry fabrics.

Long-staple cotton requirements of Indian mills are met by importation from U.A.R., East Africa, Sudan and U.S.A. The Indian mills consume annually about 5 million bales (400 lbs. each) of long-staple raw cotton, of which about 10 p.c. is imported from abroad. About 60 p.c. of the imported cotton is of American variety, followed by East Africa (10 p.c.), U.A.R. (16 p.c.) and others.

The dependence on foreign raw cotton has been still high being Rs. 83 crores in 1970 compared to Rs. 129 crores in 1961.

Markets and Problems

The share of cotton piece goods in the total exports of our country has been nearly 10 p.c. The destinations are U.K., Indonesia, Sudan, Nigeria, Australia, Kenya, Ethiopia, Tanganyika, Singapore and Ceylon. Other important markets are Afghanistan, Burma, Rhodesia and Saudi Arabia. Some of these markets, particularly Ceylon, Burma and Indonesia, are developing their own cotton textile industry. But there is significant scope for increasing Indian exports in many other countries of Asia and Africa.

More than two-thirds of the exports of Indian cloth consist of medium varieties. Nearly one-fifth consists of coarse varieties and the remainder of fine and superfine varieties. Indigenous raw cotton is used for the manufacture of coarse and medium varieties. This is an advantage on the side of India as against U.K. and Japan which have to import raw cotton of all types.

Because of competition abroad and the increasing demand at home the exports of cotton textiles from India cannot be maintained at a high level. She normally exports 12 to 16 p.c. of her total production. The main competitors of Indian cotton industry in the world markets are the U.K., Japan, France and U.S.A. In Asia, India's formidable competitor is Japan. In Africa, the main competition comes from U.K. There are export incentive schemes as well as a scheme for compulsory export of cotton piece goods from India.

If India is to compete successfully in the foreign markets, the productive efficiency of the industry is to be raised. Her

cotton piece goods will have to be competitive in price and quality. Both the reduction in costs and improvement in quality which are of considerable significance for the export market can be achieved through rationalisation. Many mills are of small size and cannot be considered as economic units. Only about 40 p.c. of the mills are of economic size. Uneconomic units are mostly in West Bengal and Tamil Nadu. A mill of economic size should have at least 25,000 spindles and 600 looms. Then again, machines and implements in many mills are old and obsolete, which need replacement immediately. Only about 8 per cent of the total looms in India are automatic compared to 67 p.c. in Japan, 60 p.c. in Pakistan, 43 p.c. in Europe and 15 p.c. in U.K. Because of large percentage of automatic looms, Japan and Pakistan are in a better position in the competitive markets than U.K. and India. In very recent years, however, several units in India have brought about modernisation of equipment from loans obtained through the National Industrial Development Corporation. Automatic looms and various other machines like Barber Colman winding and warping machines, sizing machines etc. have been installed. It may be noted that several centres like Ahmedabad, Bombay, Calcutta and Coimbatore have developed engineering industries for the production of machinery. In the near future, the problem of replacement of machinery may not involve foreign exchange. During the Fourth Plan, Rs. 134 crores will be spent on rehabilitation and modernisation of cotton textile industry.

Indian cotton goods have dominating position in Iran, Saudi Arabia, Iraq, Aden, Australia, New Zealand, etc. As these are essentially *price markets,* Indian cotton industry must reduce its cost of production, to remain competitive.

The Jute Mill Industry

After cotton, jute is the most important industry in India. The industry employs a daily average of nearly 310,000 workers. In 1970, there were 94 jute mills with an installed capacity of 6.75 lakh spindles and 74,507 looms. Every jute mill is an integrated unit and undertakes both spinning and weaving.

Calcutta has the leadership in jute mill industry. Practically all the mills are in the neighbourhood of Calcutta on the

banks of the Hooghly. Of total working jute mills, West Bengal has 77, Andhra 4, Bihar 3, U.P. 3 and Madhya Pradesh 1.

The West Bengal jute mills are of bigger size than those outside partly because of proximity to growing areas and partly for the managerial integration.

There are certain geographical factors for the localisation of jute industry along the Hooghly basin within a radius of 40 miles of Calcutta. Since the jute mill industry aims at exporting its manufactures abroad, the question of accessibility to the port is a main consideration. The location of the jute mills along the Hooghly basin is such that the mills can bring raw materials with ease from interior and can export their products readily through the port of Calcutta.[11] Had the jute mill industry been mainly intended for home market, its location would have been near the sources of raw materials. West Bengal raw jute is brought partly by rail and partly by rivers. Coal is within easy reach of Calcutta and the distance of Raniganj and Asansol coalfields is only about 180 km. This proximity to the coalfields is a great advantage to Calcutta. Humid climate necessary for jute manufactures is also characteristic of the Hooghly basin. Calcutta is an industrial centre and so there is a regular flow of labour from the neighbouring States of Bihar, Orissa and Uttar Pradesh. Then, again, the fact of Calcutta being a port makes the industry assured of supplies of imported machinery for mills.

Calcutta itself is an important jute mill centre. The other centres are Bally, Agarpara, Rishra, Serampore, Shamnagar, Kankinara, Hooghly, Bansberia, Uluberia and Budge Budge—all in the Hooghly basin and also within 60 km. of Calcutta.

There are four jute mills in the Andhra State employing about 6,500 persons. Two of these are small units, the larger units being one in *Chitavalshah* and in *Nellimarlla*. These two big factories account for about 77 per cent of the total labour force employed in the jute mills in South India. Chitavalshah in the Bimlipatam taluk (Visakhapatnam district) is a jute village. Jute is growing in the vicinity but because of its poor

[11] With the conclusion of Indo-Bangladesh treaty in March 1972 for 25 years, the import of raw jute to Calcutta from Bangladesh will make the position of the jute industry very strong.

quality it provides only a small percentage of what is used by the factory, the rest being obtained from other areas. The jute

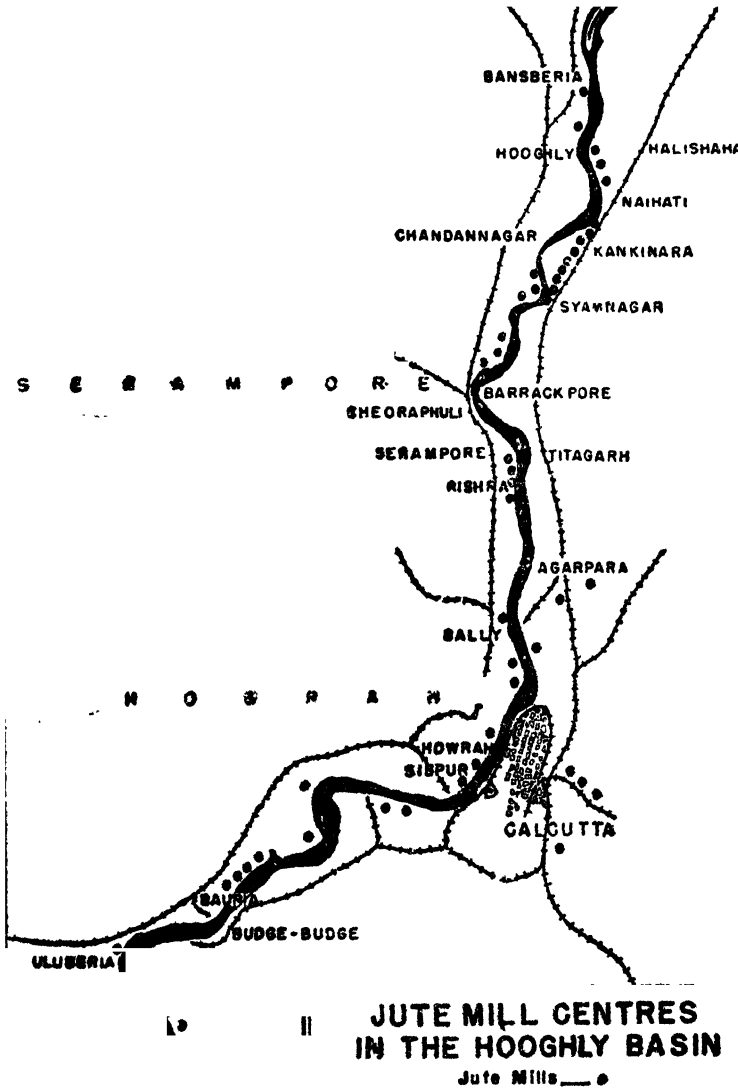


FIG. No. 94. Jute Mill Centres.

mill at Nellimarlla (Visakhapatnam district) employs about 2,000 workers.

In Uttar Pradesh there are 5 mills. Kanpur has three of these mills and employs 8,000 workers. The Indian jute mill industry consumes about 5 million bales of raw jute. Though the production of raw jute in India today is above 6 million bales, she has to depend for quality jute on Bangladesh.

The production of jute varies between 10 lakh and 13 lakh tonnes. In 1970, the production was 9·4 lakh tonnes, because of the unfavourable weather conditions and the consequent fall in the crop.

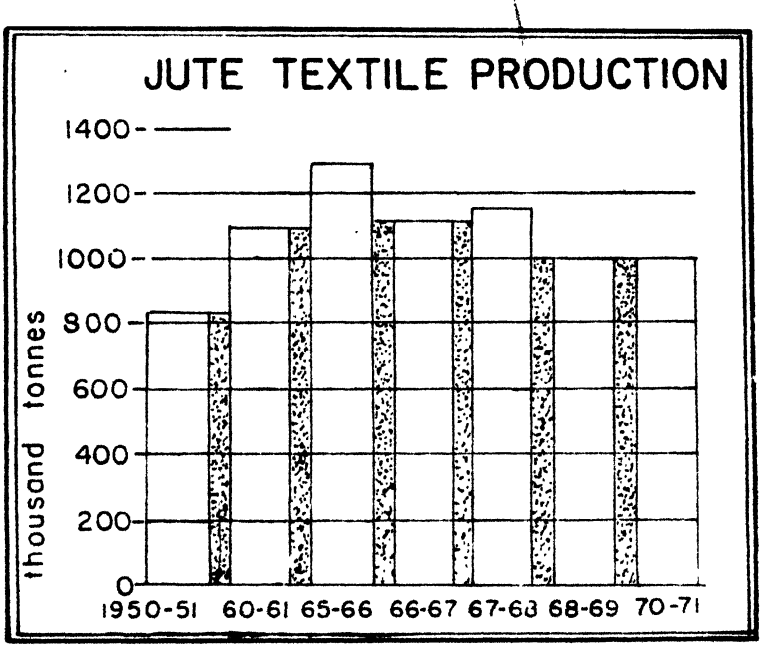


FIG. No. 95. Jute Textile Production.

Insufficiency of spinning capacity is a factor that accounts for the slow rate of increase in production. Jute manufactures may be divided into four classes: (*a*) gunny bags or sackings, used for packing rice, wheat, sugar, oil-seeds, etc.; (*b*) gunny cloth or hessians; (*c*) carpets and rugs; and (*d*) cordage. Fine and clean jute yarn of uniform size and quality is used in the cable industry.

Export of Jute Products

About 70 to 80 per cent of the manufactured jute is exported. The main markets for bags are Australia, Cuba, Indonesia, Burma, Thailand and U.K. With regard to jute cloth or hessian, about 50 p.c. of it goes to U.S.A. The other buyers of hessian are Argentina, Canada and U.K.

As jute goods are made mostly for the world market, the industry is very sensitive to the general economic climate in foreign countries. The shortage of foreign exchange in some importing countries has had adverse effect on India's export of jute. Then again, because of the steady growth of jute manufactures in many foreign countries, there are difficulties in increasing the volume of export. Egypt, Iraq, Burma, Thailand and Philippines have set up new units for jute production. The most striking fact about the jute industry is that there has been comparatively little increase in the world consumption of jute goods during the past 25 years. The establishment of a jute mill industry in any country, therefore, means a threat to India's export of jute.

The high cost of raw jute is another problem of the Indian jute industry. The jute mills do not at present work to their full capacity. "The existence of a larger home demand would enable the industry to operate to its full capacity whenever there is a slackness in foreign demand, and thus enable it to reduce the cost of production. With increased agricultural production and greater demand for packing material, it would be possible to bring about an expansion in demand".

The U.S.A. is at present the best customer of India's manufactured jute goods. It takes about fifty per cent in volume of the annual exports of hessian cloth. In value it takes about thirty per cent of the total exports of jute manufactures of all kinds. U.K. is the next largest customer of hessian cloth, but it takes only half of that of the U.S.A. Argentina takes about ten per cent of the total exports of manufactured jute goods which include hessian cloth (ten per cent), hessian bags (thirty per cent), gunny bags, sacking cloth and sand bags. Australia takes a large quantity of sacking bags for wheat and wool. There is a considerable

demand for twills in Egypt, the Levant, South America and West Africa.

For foreign exchange earnings, jute occupies the first place. In 1970, India earned Rs. 207 crores from the export of jute manufactures.

In recent years, the displacement of jute in many foreign countries has developed along two lines: (*a*) the use of grain elevators and other mechanical appliances for the bulk handling of grains in countries like Australia, Canada and Argentina; (*b*) the substitution of jute bags by bags of paper, cotton, sisal hemp and other fibres. Many substitutes like cloth and paper bags have become popular as packing materials and have captured a large part of the markets. Most of the increase in packaging demand in U.S.A. which is the most important market for hessian bags has gone to paper and bulk-handling methods. In U.K., France and West Germany, too, there has been growing demand for paper sacks in place of jute bags. In addition, bulk handling methods are coming into the markets for all types of packaging. It is a quick, convenient and labour-saving process, although, due to the heavy initial costs there are little prospects for it to make large scale entrance into the markets of the less developed countries. These methods have nevertheless captured the packaging demand in the grain trade to such an extent that about 90 p.c. of the grain in the world markets is bulk-handled at ports. New Zealand has introduced *Phormium Tenax*—a vegetable fibre for domestic wool-packing industry; Russia and Argentina use *linseed fibre*; U.S.A., Sweden, South Africa and Australia widely use *cloth and paper bags*. "Competition from paper, synthetics and consumer packing has not yet become so severe in Canada although the bulk handling of grains is increasing". Canada takes about 95 p.c. of her jute goods from India.

So long as the price of jute is kept within reasonable limits, there is no real possibility of its being ousted from the international market by the substitutes. Apart from jute's competitive cheapness, the jute bags have a resale value; they can be used time after time, and therefore in the long run are still cheaper. They can stand rough handling and bad weather and can be repaired quickly and returned to circulation.

Although markets may have been lost to competitive fabrics or in countries which are more and more tending to self-sufficiency, other new markets may be gained by introducing new lines of manufacture. The industry is carrying out diversification of production to meet changing conditions among consuming countries.[12] The output of jute goods other than hessian and sacking has increased considerably in recent years. The programme for the Fourth Plan envisages a production target of 1.7 million tonnes, corresponding to 1.1 million tonnes of exports and 600,000 tonnes of internal consumption.

Some Problems of Jute Industry

The problem before the jute industry is "to find continuing markets and new and increasing uses for its products." It is not that traditional items of jute goods are outmoded, but new products can always extend the range of jute exports.

A new demand for a special quality of wide hessian for use as a backing material of tufted carpet in the U.S.A. has encouraged the Indian jute industry to install more broad looms. Its production is now more than 6,000 tons a month.

The main drawback of the industry is, however, its obsolete machinery which, to a large extent, accounts for the high price of jute goods. To encourage modernisation of machinery in the jute mill industry, the Government has been liberal in granting licences for the import of modern machinery. The National Industrial Development Corporation has been helping the Indian jute mill industry to modernise its equipement by offering loans so that the industry can maintain the position of jute goods in the world market both against the jute manufactures of other countries and against substitutes. Most of the jute mills in India have modernised their equipment during the last few years, and it is expected that the process of modernisation will be complete very soon. A Jute Textile Consultative Board has been set up to advise Government on all important matters in respect of the industry.

[12] The new lines of manufacture include plastic furniture, upholstery, carpets, blankets, electric insulation, canvas, and bleached fibres to blend with wool or cotton.

The Sugar Industry

The sugar industry is the second largest in India, next only to textiles. The industry employs about 150,000 skilled and unskilled workers.

The industry is mainly confined to north Uttar Pradesh and Bihar which might be regarded as the sugar-belt of India. The important sugar-manufacturing centres in these two States are Kanpur, Gorakhpur, Lucknow, Allahabad, Champaran, Muzaffarpur and Bhagalpur. Other important sugar centres are Coimbatore in Tamil Nadu, Belapur in Maharashtra and Amritsar in Punjab.

There are now 200 sugar factories in the country of which 75 factories are in U.P., 40 in Bihar, 18 in Tamil Nadu and 20 in Maharashtra.

Production of sugar in India may be classified under three heads—(*a*) by modern factories working with cane, (*b*) by modern refineries working with *gur* and (*c*) by indigenous pan concerns which may be collectively called *Khandsaris*. Of these three methods of sugar manufacture, it is only the first that gives what may properly be called the white sugar of India, and it constitutes the most important section of the industry. The *gur-refining* industry as well as *Khandsari* industry are very inefficient and wasteful. More than 80 p.c. of the sugar-cane is used for the manufacture of *gur*. In 1970, the production of sugar was 4·2 million tons. The production programme in the Fourth Plan envisages an output of 5 million tons through the expansion of existing units and the establishment of new units.

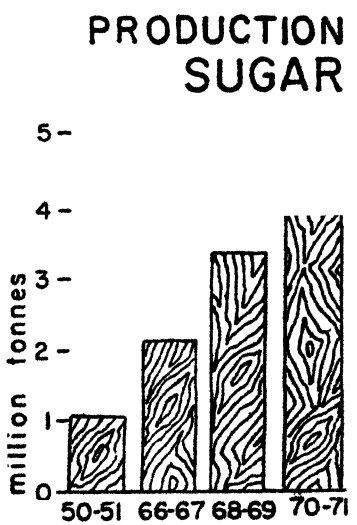


FIG. No. 96. Production of Sugar.

The present weakness of the Indian Sugar industry lies in the high cost of production which results from the (*a*) seasonal character of the industry, (*b*) high prices of cane (*c*) heavy rents for land, (*d*) high State taxation, (*e*) great waste in refining, (*f*) poor output, and (*g*) the difficulty in most cases of concentrating cultivation round the central factory.

The sugar factories of India have no control over the sugar-cane cultivation which is in the hands of ryots. These ryots possess small holdings of land and are not in a position to arrange for harvesting when the cane has reached maturity and is in the optimum condition. Moreover, in India sugar-cane areas are generally found at a great distance from the factories: as a result, the factories have to depend for their supply of the raw material on remote areas and thus pay high costs. There are two other factors which need careful consideration. The number of days the industry works in a year varies from factory to factory as well as from region to region. The minimum duration for Northern Region factories is 83 days as against 112 days in the factories of Western Zone. Then again, recovery percentage of sugar from cane depends on the nature of crushers used.

High price of Indian sugar is a handicap in the matter of export. Middle East countries normally decline to import Indian sugar as they get sugar from Cuba and Brazil at cheaper rates. Sugar-cane accounts for 60 to 70 per cent of cost of sugar. Sugar-cane cannot be cheaper unless there is more production of it, which can only be done by increasing the yield of cane per acre and also by improving the quality of cane.

The increased production and the consequent reduction in price will also help the industry to export the surplus production to Afghanistan, Tibet, Nepal, Burma, Ceylon and Bangladesh. The European countries can also be supplied with Indian sugar now that India produces a superior quality and higher grade of sugar equal to that of Java.

West Bengal is a large sugar-consuming area in India, but she has only four sugar factories. West Bengal enjoys certain natural and economic advantages for the cultivation of sugar-cane. In the U.P. and Bihar, the production of sugar-cane per

acre is between 15 and 16 tons, while in West Bengal it is as much as 35 tons, sometimes 40 tons. The soil and climate of North-West Bengal and 24-Parganas are favourable to sugar-cane cultivation. West Bengal has also the advantage of a large local consuming market. Economy in railway freight charges on finished goods is also an additional advantage for her over U.P. and Bihar. As regards availability of cheaper power West Bengal stands in a very favourable position in comparison with U.P. A very large coal-field lies near at hand and her excellent railway system and riverways bring this source of mechanical power at a cheap cost to the doors of the mills.

The sugar industry has been responsible for the growth of a number of subsidiary and by-products industries in India. Apart from the fruit canning, the confectionery and the pharmaceuticals in which sugar is an important raw material, the by-products like bagasse, press-mud and molasses have many industrial uses. In the manufacture of paper, cardboard, and insulation board, the use of bagasse is considerable. Press-mud is used in the making of carbon paper and shoe polish. Molasses have demand in the preparation of plastics, synthetic rubber, chemicals and power alcohol.

In recent years, some progress has been made in the export of sugar from India. In 1970, India exported 82,000 tons of sugar, valued at Rs. 8.6 crores as against Rs. 2 crores in 1961.

Tea Factories

Although tea plantations are essentially large agricultural undertakings, they have certain characteristics of labour investment and organisation in respect of big industrial organisations. The large labour force which they employ is mainly resident in the estates. The ownership is in the hand of the Joint Stock Companies and individuals.

There are about 7,000 tea plantations in India, of which 25 per cent is confined to Punjab and 20 per cent to Assam. However, it is not the number of plantations but their size which has made Assam the Tea Zone of India. The average size of a plantation in the Punjab is only 4 acres, whereas in Assam the average size exceeds 400 acres.

Most of the factories are located in the gardens, as it is essential that the various processes should be carried through immediately after the leaf has been plucked. The factories need to be elaborately equipped with highly specialised plants.

The Indian tea industry employs more than a million labourers, recruited mostly from Uttar Pradesh, Bihar, Madhya Pradesh, Tamil Nadu and Orissa. Assam employs more than half a million persons; in West Bengal the number is a little above 200,000.

Production of tea in 1970 was 401 million kg. compared to 308 million kg. in 1956 and 344 million kg. in 1962. Internal consumption of tea can absorb about 40 to 60 per cent of the production. However, the Government policy is to encourage export of tea to earn foreign exchange. Thus tea industry has been very much forced to depend largely on competitive markets. U.K., Canada, Australia, U.A.R., the U.S.A., France and New Zealand are the chief buyers. The U.K. is the single largest buyer and takes as much as 60 per cent of the export. The Indian tea industry contributes substantially to the finances of the Government of India. The export duty on tea is a "good illustration of a duty which has been levied primarily for revenue."

TEA PRODUCTION AND EXPORT VALUE

	Quantity (Million kg.)	Value (Rs. crores)
1967-1968	387	180
1968-69	397	157
1969-70	401	125

The percentage of Indian tea is on the decline in total tea imports of many important buyers. In U.S.A., for instance, the share of Ceylon tea was equal to that of Indian in 1951. Today, the share of Ceylon has increased by hundred per cent but that of India remained the same.

India's competitors are Ceylon, Indonesia, Japan and East Africa. The Indian tea prices are higher than those of her competitors. U.S.A. consumers are however conscious of brand

and quality. Expensive beverages are quite popular. It is necessary that India should not only reduce the cost but also improve the quality so as to earn "quality prestige image." In spite of a higher export duty, Ceylonese tea has gained much ground in this market. In addition, India's basis of levying export duty is such that it changes often and makes it difficult

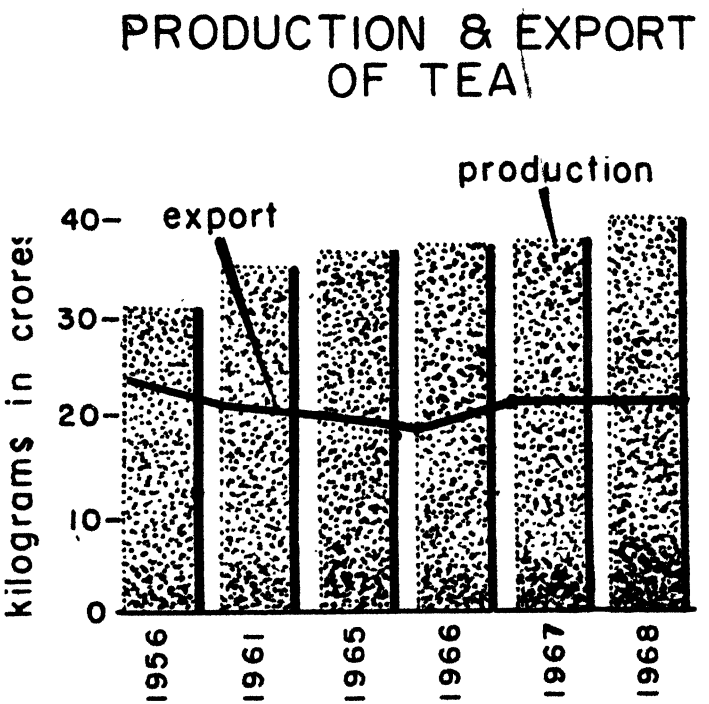


FIG. No. 97. Production and Export of Tea.

for American importers to calculate the final cost of landed tea. *As tea is a good dollar earner, it is necessary to give immediate attention to this problem.* The special features of the American tea market must be understood. More than 50 p.c. of tea in America is sold in tiny tea bags which are found very convenient by the customers for making tea. Another practice is the use of *instant tea* which is, in fact, water soluble tea powder. The Americans consider instant tea to be quick and clean.

The Tea Board is carrying on extensive propaganda in India and abroad to popularise Indian tea, and has succeeded in getting good results in Canada, U.S.A. and Egypt. At the same time, it has become imperative to give more serious attention towards the improvement in quality and reduction in price of Indian tea. The present problems of the Indian tea industry are (*a*) the shortage of chemical fertilizers, (*b*) shortage of plywood tea chests and (*c*) the frequent labour unrest in the plantations, making supplies uncertain. Further progress of the tea industry will depend on the solution of these problems. The location of fertiliser unit at Namrup (Assam) has been ideal for the tea industry in Assam. The tea chests out of plywood has become expensive because of other demands for plywood. Unless other demands are curtailed or the supply of plywood is increased, the tea industry will find the use of plywood expensive.

As Calcutta is the main centre through which West Bengal and Assam tea is exported, the partition of the country gave rise to problems in regard to transport resulting in high costs. Calcutta's railway link with the tea-gardens of Darjeeling and Assam ran through East Bengal—the eastern wing of Pakistan, and coal-supplies had to be sent through a new route involving motor transport over difficult hill roads. This increased the cost of manufacture. There is a new railway link between West Bengal and Assam through Bihar. But this route is not free from defects. The numerous rivers over which the railway bridges have been constructed, give rise to floods and interrupt traffic for fairly long periods. This has been happening in successive years since the line was completed. As these interruptions take place in the rainy season which is also the tea season, the storage difficulties become acute. Now that East Bengal has emerged as an independent sovereign State as Bangladesh, the transport link of earlier advantages will come to operate again.

The Sericulture Industry

India is a great raw silk producer. Various silkworms are reared in different parts of the country. The varieties are the mulberry silk, *tasar* silk, *endi* and *muga*. Apart from the availability of the four different types of silk, India's density of population, climate and economic conditions as well as ample

demand for raw silk hold out a good future for the sericulture industry in India.

There are three principal areas where raw silk is found: (*i*) Southern portion of the Mysore plateau with the Coimbatore district of Tamil Nadu, (*ii*) the Murshidabad, Malda and Birbhum districts of West Bengal, (*iii*) Kashmir and Jammu with the neighbouring districts of Punjab. There is also a considerable cultivation in Chotanagpur and Orissa and parts of the Madhya Pradesh of the *tasar* silkworm and in Assam of the *endi* and *muga* silkworm. *Tasar* silk is also obtained from North Bihar. Kashmir is the most important producer of silk in India where silkworms thrive best in the mulberry trees.

The silk industry of India is an important national asset with strongly marked characteristics. It consists of two well-defined sections: the production of cocoons, and the production of raw silk. The first one is essentially a village industry, and the second is a factory industry. Sericulture as a village industry affords employment to more than 28 lakh persons in villages. The handloom weavers consume 90 per cent of the raw silk available in the country.

The production of raw silk in India is about 4 million lbs. Of the total production of raw silk in India, about 75 per rent is mulberry silk, and the rest consists of tasar, endi and muga. The mulberry silk producing areas are West Bengal, Mysore, Kashmir and Madras.

The bulk of the raw silk produced in India is consumed by the handloom-weaving industry. Although there are 80 silk factories in the Indian Union, only a few mills use power-driven looms for silk manufacturers—in Bengal, Mysore and Maharashtra. The Mysore silk industry produces more than two-fifths of the total output of silk manufactures in India.

The chief silk-weaving centres are Amritsar and Jullundhur in Punjab; Banaras, Mirzapur and Shahjahanpur in the U.P.; Murshidabad, Bankura and Bishnupur in West Bengal; Bhagalpur in Bihar; Ahmedabad in Gujarat; Poona, Nagpur and Sholapur in Maharashtra; Bangalore in Mysore; Berhampur in Orissa; Salem and Tanjore in Tamil Nadu; Srinagar in Kashmir.

The different districts of West Bengal specialise in manufacturing typical varieties of silk fabrics. *Sonamukhi* in Bankura and *Islampur* in Murshidabad make shirtings of various designs while *Bishnupur* in Bankura and *Mirzapur* in Murshidabad specialise in dhotis and saries. The Bengalee weavers buy both foreign and Indian silk. The foreign sources are Italy, Japan, France, U.S.A. and U.K.

Indian silk is in demand in Ceylon, Singapore, Hong Kong, Malaysia and East Africa. Of late, America and western countries have become good markets for Indian silk. The possibilities of increasing the export of silk will have to be explored by producing fabrics of oriental design, colour and pattern.

The main problems of the Indian silk industry are the high cost and poor quality of raw silk. Since the cost of mulberry constitutes 60 per cent of the cost of raw silk, efforts are being made to increase the yield per acre of mulberry. At present only a small proportion of the area under mulberry is irrigated. Besides, the cultivators often find other cash crops being more profitable. Mulberry cultivation can be a paying occupation if its yield per acre is increased with the help of irrigation and fertilisers. It is also necessary to see that mulberry seeds are disease-free. The Central Silk Board set up in 1949 as a statutory body is taking measures for the improvement in quality from cultivation to reeling by way of research. West Bengal has a sericulture research station at Berhampore for research in the improvement and development of the sericulture industry and cocoon production.

Rayon or man-made fibre is produced from wood-pulp by forcing viscose through minute holes to form filaments which are cut into short length or staples which can be spun on ordinary cotton machinery after a little adjustment. It is the generic term for manufactured textile fibre or yarn produced chemically from cellulose.

The weaving of rayon fabrics started in India in 1931, because of the increasing demand for such fabrics in the country. The industry got excellent opportunities for expansion during the World War II when the imports of such fabrics were stopped. In the post-war period, tariff protection as well as import restriction gave further impetus for development. The

weaving of rayon fabrics is concentrated in Maharashtra, Gujarat, West Bengal and Punjab. The weaving centres are Bombay, Ahmedabad, Surat, Calcutta and Amritsar. There are also a number of small units in other parts of the country.

There are five concerns in India which engaged in the manufacture of yarn—one at Rayonpuram (Kerala), two at Bombay, one at Kota in Rajasthan and one at Hyderabad. In 1970 India produced 99,000 tonnes of rayon yarn compared to 2,000 tonnes in 1950-1951.

Apart from its two distinct advantages of durability and price over cotton, rayon has gained a considerable importance in the present emergency in the country as a wide variety of military requirements like parachutes and protective clothing are dependent on it.

There are about 300 mills in India for making fabrics out of rayon yarn. In fact, this industry has become second only to the cotton industry in importance. Because of the increasing demand for rayon yarn by mills, the production has gone up considerably. The production of rayon yarn still falls short of demand from mills, and, therefore, price of rayon fabrics is comparatively high.

Woollen Industry

Indian wool is suitable for the manufacture of carpets and blankets which are made at Amritsar, Srinagar, Bangalore, Jaipur, Agra, Mirzapore and Kanpur. Shawls are village industry products of Kashmir. The finest wool comes from Bikanir and is used in the mills. The mills are most modern in Dhariwal, Jamnagar, Gwalior and Kanpur.

Kanpur and Dhariwal were the earliest centres to start woollen manufactures as early as 1876. The local demand for woollen goods, the nearness to raw wool producing areas and cheap labour were the deciding factors. Today, there are about 50 woollen factories distributed over 8 states of Punjab (26), Maharashtra and Gujarat (9), U.P. (4), Mysore (2), Madhya Pradesh (2), Kashmir (1), and West Bengal (1).

The production of woollen manufactures in 1970 was: woollen and worsted yarn 19 million kg. and woollen and worsted fabrics 12 million metres.

The annual capacity for woollen manufactures in India is much more than the current production. The gap between capacity and production is due to shortage of good quality raw wool, and uncertain market conditions. India imports annually

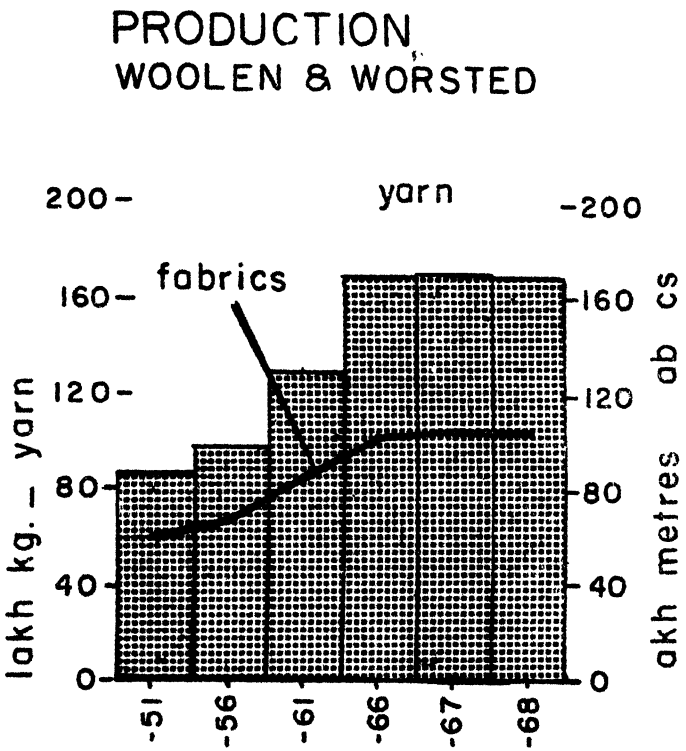


FIG. No. 98. Production of Woollen and Worsted.

15 to 17 million lbs. of semi-processed wool. If proper care is taken to improve sheep-rearing and a better and cleaner type of wool is produced the Indian Union can become less dependent on foreign supplies. A number of breeding farms have been established for the production of superior rams. Measures are also being taken for correct shearing and systematic grading in Rajasthan.

The utilization of wool by Indian mills is as follows: Blankets 50%, carpets 12 p.c., yarn 10 p.c., other uses 28 p.c. For flannel overcoating and superfine broad cloths, the merino wools are used.

A serious handicap from which the Indian woollen industry suffers is that season for weaving woollen clothes in India is about 4 months in a year, and the mills have to manufacture for many months in anticipation of a demand which may not be realised.

Carpets, rugs piece-goods and shawls are exported to U.K. U.S.A., Canada and Australia. One important problem that confronts the export industry is that the quality of wool that is being sent outside is not properly graded. This has had an adverse effect on the export trade inasmuch as all products except shawls are showing decline in demand.

The Iron and Steel Industry

The iron and steel industry in India has become within recent years one of the biggest industries in India. Her reserves of ore are so vast that there is every hope that India may eventually take an important place among the producers of iron goods. India had a fine tradition in iron and steel, evidence of which is available in the iron pillar near Kutb Minar (Delhi) dating back to 1600 years and in the iron beams of Konarak Temple (Orissa). Despite ancient tradition, the rich deposits of iron ores and the fact that the steel production along modern lines was started at Sakchi (now known as Jamshedpur) in 1908, the real progress commenced after 1951.

The backward state of industrialisation in general and the absence of metal-based industries in particular did not encourage any expansion of steel production. India has now realised that steel is a basic neeessity for industrialisation without which economy cannot stand.

The location of an integrated iron and steel plant is determined by nearness to iron ore and coking coal. An integrated steel plant has four sections : (*a*) coke oven to convert coal into coke; (*b*) blast furnaces to smelt iron ore to iron; (*c*) steel smelting plant to alloy iron with carbon and other metals to

form steel; and (*d*) rolling mills to roll the steel into saleable products. In India the various other metallic ores required in

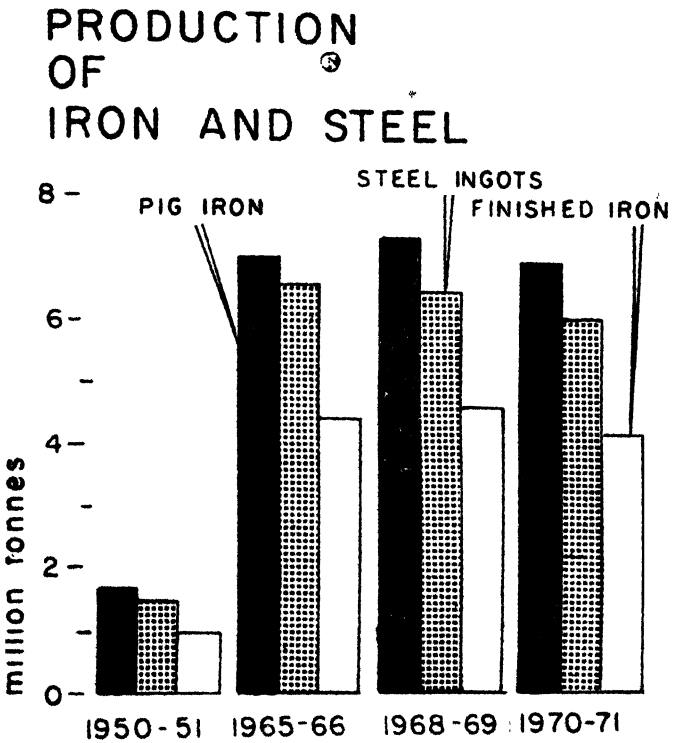


FIG. No. 99. Production of Iron and Steel.

xtracting iron from the ore are also available in abundance ot far from deposits. Again, dolomite and limestone are found thin a short distance of the ore-field.

The Centres of Production

At present, there are six integrated iron and steel centres India—two in the private sector and five in the public sector. he centres in the private sector are Jamshedpur, and Burnpur. regards the public sector, the steel plant units are located at hilai (Madhya Pradesh), Durgapur (West Bengal), Bokaro ihar), Bhadravati (Mysore), and Rourkela (Orissa). A new

plant is being established at Neiveli in South Arcot (Tamil Nadu).

Jamshedpur has been for long the principal seat for the manufacture of steel in India. It owns valuable iron-ore concessions of Gurumahisani, only 75 km. away. Iron ore is also brought from Salaipat, Badampahar and Noamundi mines in Singhbhum. Coal is brought from the Jharia field, the distance being only 145 km. Manganese is available in Malda, 48 km. south of Noamundi. Limestone and dolomite are obtained from the neighbourhood, in Panposh on the Brahmi Valley in south-west Singhbhum. The centre is connected by railways and the cost of transportation is never high. Cheap labour is always available from the Madhya Pradesh and Chotanagpur. The river Subarnarekha, though useless for navigation, supplies water to the industry. During summer this river dries up and, therefore arrangements have been made to preserve water in the Kharkai river by constructing a dam. About 45,000 people are employed in the steel industry of Jamshedpur. Because of the completion of the modernisation and expansion programmes, the Tata Steel Works now produce 2 million tons of steel a year. Its production is likely to expand to 3 million tons in the Fourth Plan period.

Burnpur is the second largest iron and steel centre under private sector in India. The city is 210 km. from Calcutta and the industry is managed by the Indian Iron and Steel Corporation Ltd. The company has achieved a high level of production and can produce about a million tons of steel ingots a year. Its production will increase to 2 million tons in the Fourth Plan.

In Mysore, the iron industry is localised at *Bhadravati* under public sector. The annual production capacity for steel ingots is about 100,000 tons. The forests of the Shimoga and Kadur districts supply charcoal for smelting iron ore. Limestone comes from Bhandigudda. Recently, the Mysore Works have completed the cast iron spun pipe plant with a capacity of 17,000 tons per annum. A ferro-silicon plant of a capacity of 20,000 tons per annum is also being installed.

Two units for the production of pig iron are being set up in the private sector in Maharashtra and Goa.

The *Bhilai* plant which is located in the district of Drug in Madhya Pradesh is destined to play a very important part in the national development of our country. Drug area is noted for iron ore deposits—particularly the *Dalli Rajhara* range of hills, 30 km. south of Bhilai. Iron ore is also found in the adjacent areas of Hahaladdi, Kondapukha, Chargaon and Rowghat. The quality of iron ore is everywhere high, and the deposits from Drug, Chanda and Bastar exceed 1,650 million tons. About 210 km. to the west of Bhilai, semi-metallurgical coal to the extent of about 66 million tons is available. Besides, large reserves of blending and other coal (approximately 260 million tons) exist at Korba. Limestone, another important raw material in the production of steel, is found almost at site. Flux grade dolomite has been met with at Bhaneswar, Kasondi, Parsoda, Kharia, Ramtola and Hàrdi in Bilaspur district and Bhatpara and Patpar in Raipur district. The quantity of water required in the steel plant is being supplied from the existing Tandula tank which will be further reinforced by the Gondli Project now under construction. The Bhilai plant has been developed in collaboration with Russian Organisation, and commenced production of pig iron from February 1959. There will be six open hearth furnaces of 250 ton capacity each, producing one million tons of ingots annually. In 1969, the production of pig iron and steel ingots was 1.9 and 1.8 million tonnes respectively.

The main finished products of the Bhilai steel plant are rails and heavy structurals, merchant products and pig iron. The various by-products include ammonium sulphate, tar, benzol, benzene, xylene, toluene and naphthalene.

Durgapur in West Bengal is the second steel centre under the public sector completed in 1962. all the units of the plant have already achived the rated capacity of production. It is equipped to produce light and medium sections of steel and billets. For the supply of iron ore to Durgapur, the mines in the Bolani region of Orissa are worked. The site has certain advantages like nearness to coalfields of Raniganj and Jharia and the excellent transport connections with Calcutta.

In 1969, Durgapur plant produced about 9.9 lakh tons of pig iron and 7.5 lakh tons of steel ingots. The plant is being expanded to raise 16 lakh ingots in near future.

The third steel plant in the public sector is at *Rourkela* in Orissa which has been developed with the German combine of Krupps Demag. A dam has been built across the river Sankh to ensure adequate supply of water to the steel works throughout the year. A railway line runs from Rourkela to Dumaro. "The plant is ore-based: the site is in proximity to good quality iron ore in the Bonai ore range, 50 miles away. Limestone, dolomite and manganese are within easy reach." It is the only plant of its kind in the country to manufacture exclusively flat products. Production in 1969 included 1.2m tons of pig iron and 1.1m tons of steel ingots. The capacity of the plant will be increased to 1.8 million tons of ingot steel per annum soon. The fourth steel plant under Public Sector is at Bokaro with capacity to raise 1.5 million tons of steel ingots. Bokaro has the geographical advantage of being near to Kargali, Bokaro and Jharia coalfields. Iron ore is a little far away but "the coal empties from Rourkela and Bhilai will carry iron ore on their return journey."

There are schemes to set up pig-iron plants in Punjab, West Bengal and Tamil Nadu. During the fourth plan period, the Government has decided to set up two stainless steel units—one at Madras with an annual capacity of 7,000 tons and the other at Vatwa in Gujarat with an initial annual capacity of 10,000 tons.

Pattern and Range of Production

The iron and steel industry in India has developed a varied pattern of production including industrial machinery for industries like cotton, cement and sugar, railway rolling stock and components, structural fabrication, tin plate, sheets etc.

The iron and steel production in India is utilised for making heavy rails and fish plates, heavy structurals, sleepers, medium and light structures, round and flats, tin plate, plates and sheets. The primary difficulties of the iron and steel industries are associated with transport, supplies and constant variations in the quality of raw materials. Despite all these difficulties, high levels of production have been achieved.

IRON AND STEEL PRODUCTION IN INDIA

(In Million tons)

	1950-51	1960-61	1969-70
Pig-iron ...	1.69	4.31	7·39
Steel Ingots ...	1.47	3.42	6.43
Finished steel ...	1·04	2.39	4.94

For the expansion of steel production in India, the Government has adopted a two-fold policy—(*a*) helping the existing units, and (*b*) erecting new plants, the responsibility for which will be that of the State.

Import and Export of Steel

The size and rate of expansion of the iron and steel production in India is an indication of the expanding demand. The production is yet inadequate to satisfy the requirements of the different kinds of iron and steel goods.

In 1970 the imports of steel goods cost India Rs. 81 crores in foreign exchange. The imports are steel billets and slabs, plates and sheets, rail, etc.

India exports a large quantity of pig iron and steel manufactures. The bulk of the shipment goes from Calcutta. Madras also handles a considerable quantity. The chief markets for pig iron are the U.K., the U.S.A. and Japan while scrap iron and steel for re-manufacture go mainly to the U.K. and Japan. In 1970, India exported iron and steel goods worth Rs. 77 crores.

The future outlook for the Indian iron and steel industry is bright. The immense natural resources of the country, particularly in comparison with those of some other eastern lands, its position of easy accessibility to the markets of the Indian and Pacific Oceans, the proved metallurgical skill of its iron masters and steel founders, and the commercial ability already displayed in the development of the export trade in pig iron—these, together with the great potential and growing home market for steel goods of every description, all presage expansion.

Engineering Industries: In view of the development of metallurgical industries in India resulting in the increasing pro-

duction of pig iron, steel and castings, steps are being taken to build engineering industries which will make available within the country a wide range of items like agricultural machinery, industrial machinery, constructional equipment, machine tools, heavy and light electrical equipment, etc. India has already become self-sufficient in a variety of engineering articles. Engineering industries can be divided into two groups.

(*a*) Mechanical Engineering industries.

(*b*) Electrical Engineering industries.

The products of the Mechanical Engineering industries are machinery, structural fabrication, precision instruments, surgical instruments, railway rolling stock, tractors, automobiles and ancillaries, bicycles, sewing machines, rollers etc. The Electrical Engineering industries are concerned with products like electric cables and wires, electric fans, electric lamps, dry batteries, etc.

Large-scale developments are taking place with regard to manufacture of industrial machinery for cotton textile, cement, sugar and paper factories. In addition, agricultural machinery, mining machinery and dairy machinery are receiving emphasis. Some of the principal centres are Ranchi for heavy machinery, Durgapur for mining machinery, Bhopal for heavy electrical equipment, Bangalore, Pinjore in Punjab, Kalamessery, and Hyderabad[13] for machine tools. Chittaranjan is noted for railway rolling stock including electric locomotives. The other centres of activities are Lucknow for the production of precision instruments, Rupnarayanpur (West Bengal) for communication cables and Guindy (Madras) for surgical instruments. Mention may be made of heavy electric equipment plant at Ranipur, Hardwar and heavy power equipment plant at Ramchandrapuram in Andhra Pradesh; and high pressure boilers at Tiruchirapalli in Madras. The Fourth Plan programmes in respect of engineering industries have the objectives as follows:

[13] The factories for machine tools at Bangalore, Pinjore, Kalamessery and Hyderabad are managed as a Government of India undertaking, the Hindusthan Machine Tools Ltd.

(*i*) to reach the goal of self-sufficiency, (*ii*) to consolidate the position for sound industrial base and (*iii*) to fill the specific gaps in the spectrum of machine-building capacity.

Paper-Making in India

The chief factors in the location of paper industry are (*a*) plentiful supplies of soft water, (*b*) nearness to fuel supplies, (*c*) nearness to chemical supplies, (*d*) nearness to paper-consuming areas, and (*e*) nearness to a port or trade centre where wood-pulp and other grasses for pulp can be obtained.

Calcutta with its neighbourhood is the principal centre of the paper industry in the Indian Union. The other centres are Dalmianagar, Lucknow, Bombay, Punalur (Kerala), Saharanpur and Jagadhri. At present there are 28 mills in the Indian Union.

Both West Bengal and Maharashtra has 6 factories each, followed by Haryana with 3, Orissa, Mysore, U.P., Andhra Pradesh with 2 each and Bihar, Kerala and Gujarat with 1 each.

The Bengal mills are the largest in India and have an annual rated capacity of 105,000 tons out of India's total of 724,000 tons. The paper mill in West Bengal use bamboo and sabai grass for pulp. Sabai grass is obtained from M.P. and Berar while bamboo from Assam and the State itself. West Bengal paper mills employ about 18,000 workers. The paper mill centres are Kakinara, Titagarh, Raniganj, Chandrahati and Calcutta.

In Maharashtra, the largest mill is at Khopoli. The mill at Bombay city produces card-board, etc. The annual rated capacity of the three factories in Bombay is 5,100 tons. The other centre is Hadaspur. The Bihar factory at Dalmianagar can produce 48,000 tons, a capacity second to West Bengal mills only. Jagadhri and Faridabad in Haryana, Bhadravati and Nanjangud in Mysore ; Rajamundri in Andhra Pradesh ; Punalur in Kerala, and Brajrajnagar in Orissa are the other important centres.

The Indian paper industry gives employment to more than 30,000 people. A basic requirement of the paper industry is the supply of suitable fibrous raw materials. At present *sabai grass* and *bamboo* are the principal raw materials for paper manufacture in India. Wood-pulp constitutes only 10 per cent of the

total raw material. In India forests of coniferous trees—pine, spruce and fir—are available in the Himalayas, but it is not possible to exploit them commercially on account of the lack of transport facilities. There are possibilities, however, for using pine-wood of Jammu and Kashmir for the manufacture of pulp. *Bagasse* is an important raw material for Indian paper industry, isasmuch as its production exceeds 3.7 million tons a year. The main centres of bagasse are U.P. (2 million tons), Bihar (0.6 million tons), Maharashtra (0.3 million tons), Andhra Pradesh (0.2 million tons), and Haryana (0.15 million tons). Due to seasonal operation of the Sugar Industry, the availability of bagasse is not certain. Then again, the heavy use of bagasse as fuel by the sugar mills may not make it easily available to paper industry unless alternative fuel for the sugar industry is provided. Sabai grass, which grows abundantly in Northern India, is now used for making pulp in Punjab and U.P. For cheaper varieties, rag, hemp, jute waste and waste paper are used. There is considerable possibility of increasing the use of waste paper and rags as materials. "The utilization of waste paper in India is only 8 per cent against 30 p.c. in other countries." Bamboo pulp has been so far the mainstay of the paper industry and comprises about 70 per cent of the cellulosic raw materials used for manufacture of paper. In spite of the abundance of bamboos and grass forests in the country, there are difficulties for the paper mill to obtain these raw materials. There is no centrally controlled and co-ordinated forest policy to ensure a regular supply of forest resources. The following measures have been suggested by the Planning Commission to solve the problem of raw material

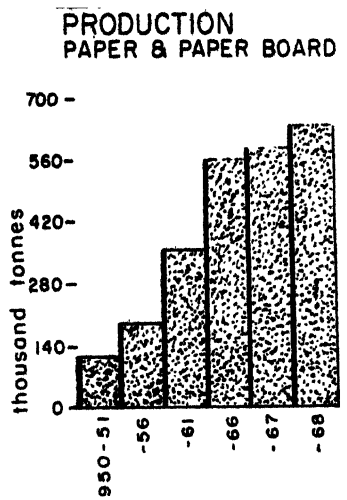


FIG. No. 100. Paper and Paper Board Production.

supplies to paper industry: (*a*) reservation of specific forest areas for the paper industry; (*b*) a rational method of price fixation on an all-India basis to enable the industry to obtain regular supplies of bamboo and grass at reasonable prices; (*c*) development of roads in forest areas for facilitating transport. There can be no doubt that if the forest resources are exploited in a planned manner, the paper industry will be able not only to meet the requirements of the country but will also cater to the needs of the neighbouring countries.

The supplies of bamboo in areas where the other conditions are favourable for its exploitation are sufficient to meet the needs of all the paper mills in India and leave a surplus from which an export trade in pulp can be developed. It grows extensively in Assam, Tamil Nadu and Maharashtra. The advantage of bamboo is that the cutting rotation is on average four years as against 60 years in the case of wood. Further, the dead bamboo stems remain suitable for the manufacture of pulp for at least 4 years. Its yield is larger than sabai grass and cost cheaper. As a raw material, however, bamboo is inferior to sabai grass; but in India, the demand for superior quality paper is limited. The new industrial uses of bamboo for rayon grade pulp may, however, bring about a shortage of bamboo for the paper industry.

The paper industry of India is working under certain disadvantages. Most of the chemicals, like caustic soda, soda ash, salt cake, bleaching powder and dyes, are to be imported from abroad at high prices in spite of increasing production of some of these chemicals in India. Moreover, these chemicals are brought to the mill-centres from the ports, and the transport charges are heavy. The problem of power is no less acute. Most of the mills pay heavy charges for coal as the best coalfields are mostly confined to the Damodar basin of Bihar-Bengal.

The types of paper manufactured in India are white and unbleached printing, writing paper and envelopes, packing papers, pulp board, coloured printing other than newsprinting, badami, blotting and manila. The following types of paper are still not manufactured in India: photographic base paper, foil paper, electrical insulation paper, glassine paper and brush coated art paper.

The production of paper and paper boards in 1970 was 724,000 tonnes compared to 116,000 tons in 1950-51.

The newsprint factory at Nepanagar in Madhya Pradesh has an installed capacity of 30,000 tons. This factory, known as Nepa Mills, is in a position to manufacture newsprint from indigenous pulp weeds and sabai mechanical pulp. The quality of the newsprint is not yet up to the standard of the imported newsprint. The cost of production is also high. The present internal demand for newsprint is about 70,000 tons a year. Other ideal places for the location of mills for the manufacture of newsprint are Kashmir and Tehri Garhwal where fir and spruce in sufficient quantities are available. A five-fold expansion from 30,000 tons to 150,000 tons in newsprint is being worked out by doubling the Nepa Mills and establishing new newsprint factories based on bagasse and soft woods available in the Himalayan region.

Indeed, the expansion of newsprint industry in India is a vital national necessity. Experiments show that newsprint can be manufactured in India from the Indian spruce, paper mulberry and pula. Indian spruce occurs in the hills of Punjab, U.P. and Kashmir.

Expensive rag papers, art paper, blue match paper, etc. are not likely to be made in India in near future. Recently, however, a mill for the production of tissue paper has been founded at Tribeni, Hooghly.

The paper industry has increased its production considerably, but the output is not yet adequate to meet the entire requirements of the country. The *per capita* consumption of paper in India is still very low with 2 lbs. per year compared to 400 lbs. in U.S.A. and 200 lbs. in European countries. Because of the spread of literacy, the consumption of paper in India has of late increased considerably. From 185,000 tons in 1951 the consumption has gone up to more than 700,000 tons in 1969.

Vigorous efforts are being made by paper industry to increase the export of paper and paper board to neighbouring countries in the Middle East and Africa.

Chemical and Allied Industries

India has more than 280 chemical factories providing employment to about 40,000 workers. The chemical industry has made enormous progress during the last few years. The range of manufactured products has greatly increased, and besides factories of basic products, raw materials for agriculture and industry, the Indian chemical industry manufactures many articles for direct consumption.

Chemical industry supplies materials which are used in other industries or agriculture. The production of soap, paper, leather, glass, paints and varnish, drugs, rubber, etc. requires chemicals without which they cannot be manufactured.

The chemical industry can be divided into:

(*a*) Heavy chemicals.
(*b*) Organic chemicals.
(*c*) Electro-chemicals.

At present several types of heavy chemicals are manufactured in Bombay, Calcutta, Delhi, Kanpur, Amritsar, Madras and Bangalore, but the production is not sufficient to meet the requirements of the country. India's sources of raw materials for heavy chemicals are not deficient if only the various mineral ores are properly treated. Salt, limestone, gypsum, bauxite, zircon, ilmenite, beryl, monazite, kaolin, etc., are found in abundance. In regard to fuel, the problem is very serious, because cheap coal is not available in centres such as Delhi, Madras, Bombay and Bangalore; it is available only in West Bengal. The hydro-electric schemes which are being developed in the Punjab, Tamil Nadu and Maharashtra will in a few years' time be able to supply cheap electric power.

PRODUCTION OF CHEMICALS IN INDIA

(in '000 tonnes)

	1960-61	1966-67	1968-69	1969-70
Sulphuric Acid ...	363	702	1024	1129
Caustic Soda ...	125	233	313	361
Soda ash ...	148	348	399	487
Nitrogenous fertilisers	101	308	541	716
Phosphatic fertilisers	53	145	210	222

There are 44 factories for the production of sulphuric acid with rated capacity of 1,049,000 tons. Caustic soda plants are located in Rishra (West Bengal), Mettur (Tamil Nadu), Ahmedabad, Mithapur, Delhi and Dehri-on-Sone. The problem of sulphuric acid industry is the dependence for sulphur on foreign countries.

The *organic chemical industry* in India has been a post-war development, greatly stimulated by the First and Second Plans. One of the most important factors for the expansion of chemical industry is the demand by various other industries for organics as raw materials. As yet oil has not become an important raw material for organic chemicals in India. Vegetable raw materials like cellulose, sugar and vegetable oils are being used as raw materials for rayon, cellulose acetate and polythene plastics, synthetic rubber and paints. *Coal tar* is the foundation from which benzole, anthracene and anthracene oil are obtained for use in dyes, explosives, flavouring essences, perfumes, plastics, pharmaceutical and photographic chemicals. Coal tar production and its distillation are centralised in Calcutta, Kulti, Jamshedpur, Bombay, Jharia and Hirapur. Paints and varnishes are concentrated in Bombay and Calcutta. *The Electrochemical industry* is of recent origin in India. Among the many products, the chief ones are calcium carbide, aluminium, magnesium and ferro-manganese. In many of these industries, electrical energy forms the major portion of the cost of the products, success or otherwise of the industry being largely dependent on the rate at which power is made available to the industry. In India the scope for the development of electro-chemical industry has been greatly restricted by the high cost of electric energy. The several multipurpose projects which are under construction will in the near future improve the position. "With the availability of energy at economic rates in the near future and with the great variety of raw materials found in abundance in this country, there is an alluring prospect of new industries based on electro-chemical technology being started, and also for the improvement of those existing already in the country."

Drugs and petro-chemicals have made great progress since 1948. The more common products are sulpha drugs, penicillin, streptomycin, D.D.T. etc. In 1955, a penicillin factory was set

up at Pimpri near Poona. In sulpha drugs, too, substantial progress has been made in Bombay, Baroda and Calcutta. D.D.T. is manufactured at Delhi. Though not of considerable value, India exports medicinal and pharmaceutical products to Nepal, Pakistan, Burma and Malaya.

So far as petro-chemicals are concerned, the erection of first menthol plant at Bombay in 1966, followed by naphtha cracker plant at Trombay in 1967 for the production of intermediates for synthetic plastics, solvents and various other chemicals and a PVC plant on ethyl alcohol at Mettur (1967) laid the foundation of petro-chemical industry. A number of private units have been approved for the manufacture of petro-chemicals, and the total investment till the end of the Third Plan period was Rs. 200 crores.

Fertiliser industry is bringing about a spectacular revolution in Indian farming. The industry is carried on both by the public and the private sectors. In the public sector, the Fertiliser Corporation of India Ltd. has operating units at Sindri (Bihar), Nangal (Punjab), Trombay (Maharashtra), Gorakhpur (U.P.), and Namrup (Assam) which produce ammonium sulphate, calcium ammonium nitrate, nitrogen and phosphates. In 1969, the production was as follows: Sindri 2.1 lakh tonnes of ammonium sulphate ; Nangal 3 lakh tonnes of calcium ammonium ; Trombay 70,000 tonnes of urea and 164,000 tonnes of nitrophosphate; Namrup 11,000 tonnes of urea and 30,000 tonnes of ammonium sulphate ; and Gorakhpur 1 lakh tonnes of urea. Rourkela plant, an adjunct of Rourkela Steel, raised in 1968-69 about 2.4 lakh tonnes of calcium ammonium nitrate.

The factories in the private sector are located at Ennore, Varanasi, Gujarat, Visakhapatnam, and Kota. New factories are being set up both in the public and private sectors—Namrup, Durgapur, Cochin, Madras, Alwaye and Barauni in the public sector and Baroda and Kanpur in the private sector.[14]

India has not yet become self-sufficient in chemical fertiliser. There is need to create additional capacity both in the public and private sectors by setting up new fertiliser units and by

[14] It is envisaged that two or three fertiliser projects based on coal would be taken up for implementation during the Fourth Plan.

permitting expansion of operating units, where feasible. The current problems of the industry are: (*i*) inadequate availability of coke oven gas at Rourkela; (*ii*) inadequate supply and poor quality gypsum and coal at Sindri; (*iii*) low efficiency of equipment operating over long periods at Sindri and Alwaye; (*iv*) imposition of power into at Nangal; and (*v*) labour troubles in some of the units.

Glass and Ceramic Industries

The glass industry is carried on under two systems: (*a*) the indigenous cottage industry, and (*b*) the modern factory industry.

The indigenous glass industry with 93 small factories is spread all over India, but the chief areas are the Firozabad district of the Uttar Pradesh and the Belgaum district of Mysore. Bangles are mostly made at Firozabad which supplies nearly one-third of the country's demand. So complete is the concentration of the bangle industry at Firozabad that practically no bangles other than the indigenous (*desi*) bangles of the village workers are made elsewhere in India. The industry is, however, decentralised at Firozabad and all the processes are carried on in shops employing 5 to 35 persons in each.

The modern glass industry is more or less restricted to the production of the following classes of goods:

(1) Glass cakes for bangles.
(2) Beads, bottles, lampware, phials, table wares, etc.
(3) Sheets and plate glass.
(4) Surgical and Laboratory requirements in glass in special cases.

The present annual production of glass sheets is about 90 million sq. ft., of laboratory glass ware 5,000 tons, of glass shells 70 million pieces and of other glass ware 200,000 tons.

Uttar Pradesh, Bombay and West Bengal are the three main States for glass factories. About 25 per cent of the total production of glass in India comes from U.P. where it is mainly confined to the western side.

The glass industry has developed to a considerable extent in Uttar Pradesh where 24 factories manufacture bangles, hollow and pressed wares, glass sheets etc. ***Bahjoi*** in the district of

Moradabad is an important glass-sheet making centre in India. Two sheet glass factories are being set up at Tiruvottiyur and Sembium in Tamil Nadu. The production of sheet glass has increased considerably from 10 million square feet of sheet glass in 1951 to about 90 million square feet as at present. Hollow and pressed wares like motor head-lights, reflectors, bulbs, chimneys, etc., are produced in Shikohabad, Hathras, Naini and Bahjoi. The factors that led to the success of the glass industry in U.P. are availability of sand, potash, nitrate and limestone. Its labour is cheap and skilled. Limestone is available in Mirzapore district. The only disadvantage of U.P. is the absence of coal within its borders. The designs of bangles and glasswares are all old-fashioned and are mostly imitations of the Japanese brands of Moradabad brasswares. The industry is in the hands of small dealers, and as such it is not properly organised.

Lamp wares, bottles, glass tubes, flasks; breakers, test tubes, plate glass, etc., are mostly made in Bengal and Maharashtra. There are 18 glass factories in Maharashtra, employing about 4,500 workers. In Punjab, the principal centre of industry is Amritsar with its four glass factories. These factories produce mostly bottles. There is also one factory at Ambala which produces both scientific goods and hollow wares. Madhya Pradesh and Bihar have modern glass factories, more than five in each. Delhi is also a glass-centre.

The most commonly used raw materials are sand, borax, soda ash, salt cake, dolomite, limestone, saltpetr , sulphur, manganese dioxide and colouring materials. Sand which constitutes 70 per cent of the batch materials is available in the various parts of the country with varying quality. Borax is not found in India and has, therefore, to be imported from U.K. and U.S.A. There are abundant supplies of good quality dolomite, saltpetre and limestone in the country. The other raw materials like sulphur, manganese dioxide and colouring materials are imported. The main difficulty of the Indian glass industry today is the procurement of soda ash which is now partly imported and partly obtained from the Indian soda ash factories. Coal and fuel oil are used for glass smelting, choice being dependent on prices and availability in the neighbourhood. West Bengal, Bihar and U.P. use coal while oil is common in Maharashtra and Tamil Nadu.

Exports of glass and glassware are sent to Aden, Bahrein Island, Ceylon, Burma, Malaysia, Saudi Arabia, Iran, Afghanistan, Indonesia and Indo-China.

The manufacture of optical and ophthalmic glasses will be an important development in the Plan period. The centre for opthalmic glasses will be Durgapur in West Bengal which is already an industrial centre of considerable importance.

Ceramic products : Though of recent origin, there has been considerable progress of ceramic industry in India. There are now a little more than 50 ceramic factories for the production of white wares, sanitary wares, glazed tiles and high tension insulators. The important centres are Calcutta, Bombay, Bangalore, Madras, Delhi and Baroda.

Aluminium Industry

India possesses large reserves of high grade bauxite suitable for the manufacture of aluminium. Deposits of bauxite are available in Madhya Pradesh, Orissa, Bihar, Tamil Nadu, Maharashtra, Jammu and Kashmir. India possesses bauxite, the basic raw material for aluminium to the extent of 250 million tons of which 25 million tons have already been proved to be suitable for the manufacture of aluminium. Cheap electric power is an important factor in the production of aluminium. About 20 per cent of the cost of smelting is accounted for by electric power.

Aluminium has assumed great importance as a metal because of its lightness, corrosion-resistance, electrical conductivity and ease of fabrication. The metal is used in transport, chemical, brewery and food industries, building and architecture, insulation and paints. The aircraft industry is entirely dependent on the use of aluminium alloys. The metal is also used for bus bodies and railway coaches. Aluminium vessels are much more suitable for use in the kitchen than those of other metals. Aluminium containers are also replacing containers of tin-plate. For India, the aluminium industry is one of supreme importance in view of the fact that aluminium is the only non-ferrous metal which is produced in large quantities within the country.

The Aluminium industry is located at *Alwaye in Kerala, Belur and Asansol in West Bengal, Muri in Bihar, Hirakud in*

Madhya Pradesh, and Bombay. Bauxite is mainly mined in the Lohardaga region of Bihar. The processing of bauxite ore to alumina is done at Muri in Bihar. Alipuram (Alwaye) in Kerala State is concerned with the electrolyte reduction of alumina to aluminium metal. The rolling of aluminium metal to sheets and circles is done at Belur in West Bengal. Bombay has started the manufacture of aluminium powder and paste. A new aluminium centre is being opened near Katni in Madhya Pradesh.

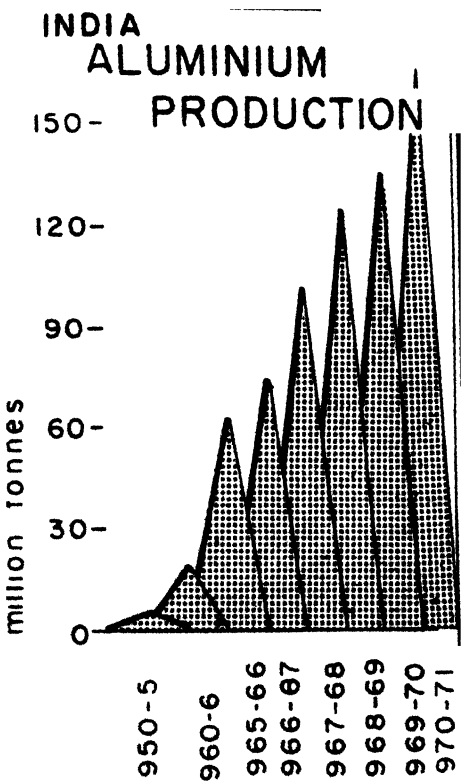


FIG. No. 101. India—Aluminium Production

The factory at Hirakud has a capacity to produce 10,000 tons per annum. Steps are being taken to popularise the industrial and other uses of this metal. Till 1950, about 90 per cent of

the demand for this metal was for making utensils. With the development of three new plants at Salem (Madras), Koryan (Maharashtra) and Rihand (U.P.) and the expansion at Hirakud and Asansol plants the total installed capacity has gone up to 83,100 tons.

The aluminium production in 1969 was 126,000 tonnes compared to 240,000 tons for demand. As the present production meets about 50 per cent of the requirements, imports come mainly from Canada, U.K., U.S.A. and Norway which account for 90 per cent of the aluminium imports.

The main requirement of aluminium industry is a dependable source of electrical energy and consequently the development of the industry is being hampered by the absence of adequate supplies of power at reasonable rates. Countries like Norway, Switzerland and Japan have established smelter capacities though they have no bauxite resources of their own. The progress of aluminium industry in the country would depend on cheap and abundant supplies of power and the facilities for transport of bauxite or alumina to the smelter sites.

High grade bauxite containing over 50 per cent alumina occurs in Madhya Pradesh, Bihar, Maharashtra, Tamil Nadu Mysore, Orissa and Kashmir. After meeting the requirements of the aluminium industry, a little bauxite is exported to U.K. Japan and Pakistan. Indian aluminium industry, however depends entirely on the import of cryolite and fluoride, though there are deposits of fluorspar in Rajasthan, Madhya Pradesh and Gujarat. In aluminium, expansion during the Fourth Plan will take care of domestic requirements and export. The production will increase to 320,000 tonnes by 1973-74.

Leather Industry

Leather and leather goods industries in India are as follows : (*a*) tanning of hides and skins, (*b*) manufacture leather footwear and (*c*) manufacture of leather goods other than footwear. Tanned hides and skins are mostly exported and occupy fourth place in order of importance in the exports of our country.

There are four sectors in Indian tanning : organised tanneries producing finished and chrome tanned leather ; small-

scale tanneries producing chrome tanned upper leather; tanneries producing vegetable tanned hides and skins, and village tanneries producing vegetable tanned leather for local consumption.

There are about 35 organised tanneries in India which use highly modern tanning materials for treating 2.5 million pieces of hides and skins. The important centres of modern tanning are Calcutta, Kanpur, Agra, Delhi and Madras. About 2 million chrome tanned hides a year come from 250 small-scale chrome tanneries in Calcutta and a few other places. More than 8 million vegetable tanned hides and 20 million vegetable tanned skins are produced by 500 tanneries which use vegetable tanning materials. Most of such tanneries are in the South. Village tanneries use varam or turwar bark (*Causia Auriculata*). Their methods are crude, and they produce 8 to 9 million vegetable tanned hides and 3 to 4 million vegetable tanned skins.

The principal use of leather is for the production of footwear. The industry receives a considerable fillip from large military demands for boots and shoes, harness, saddles and other army equipment.

India supplies about 30 per cent of the goatskins of the world. The Indian goatskins are considered to be the best raw materials for high class kid. The export of lamb and kid for skins is an interesting development of recent years. In future, India's fur-skins will play a very useful part in international commerce.

India exports hides and skins undressed, and footwear. Because of the increasing demand for leather in India, the exports of hides and skins are not likely to remain important in the near future. The principal buyers of Indian leather and leather goods are U.K., U.S.A., U.S.S.R. and West Germany.

The Ship-Building Industry

Although India had a very flourishing ship-building industry based on wood even as late as the 18th century, it declined subsequently in competition with the steel-made ships. Some wooden ships known as country crafts are still made in India on her western coast, but their importance from the point of

view of industry is insignificant. The necessary requisites for the modern ship-building industry are :

(*i*) Ship-building and repairing yards.
(*ii*) Deep water in the harbour.
(*iii*) Availability of construction materials for engines, plates etc.
(*iv*) Supply of skilled labour.

The success of the industry depends on the availability of raw materials, machinery and equipment for the construction of ships. Steel is required to be supplied in a wide range of sizes, keeping in view the required strength, maximum dead weight, speed etc. of the vessel and also economy in the cost of production. India is fairly rich in iron ore and there are important steel manufacturing centres in India which can supply ship-building materials, but engines, propellers and other machinery are still to be imported from abroad. Another difficulty in connection with the ship-building industry is the absence of deep estuaries for launching ships.

Visakhapatnam in Andhra Pradesh is today the principal centre of ship-building industry in India. The situation of Visakhapatnam at the centre of the eastern coast between Calcutta and Madras offers great facilities for bringing down the necessary materials from the hinterland of these two big ports. Visakhapatnam has the additional advantage of possessing a deep-water harbour which permits the launching of big ships. The tidal range is also satisfactory. Steel, the most important raw material, can be brought to the shipping yard from Jamshedpur, Rourkela and Durgapur. The Gondwana coalfields are also within easy reach. Timber, necessary for making decks, cabins etc. is obtained from Chotanagpur. The local man-power is cheap and can be made suitable for modern technique, if properly trained. Already the Visakhapatnam ship-yard has become a very good ship-building base and builds ships at internationally competitive prices. The present capacity of ship-building at Visakhapatnam is 20,000 GRT. The ship-yard has four building berths to build ships ranging from 5,000 to 15,000 tons dead-weight capacity. There are programmes for the expansion of the Hindusthan Shipyard and

the construction of a dry dock at Visakhapatnam so as to enable the Visakhapatnam shipyard to produce six ships of 12,000 DWT each per year.[15]

Cochin has been selected as the second ship-building centre in India. The backwaters of Cochin provide an excellent harbour. The work for building ships in collaboration with Japan will soon start.

Bombay and Madras can develop the ship-building industry, but there are certain disadvantages. Bombay is many hundred miles away from the coal and iron fields. The harbour of Madras is artificial and the sea is shallow. Therefore, big sea-going steamers cannot be launched. Besides, the hinterland does not possess ship-building materials. The most ideal sites near Calcutta are Uluberia and Rajganj because better depths of water are available here. As a ship-building centre, Calcutta has the advantage of being near the source of raw material supply and in the midst of a highly developed mechanical engineering industry.

Aircraft Manufacture

The entire responsibility for the production of aircraft and allied equipment in India is that of the Hindusthan Aeronautics Ltd., of Bangalore which was set up in the public sector. Three more centres—Nasik, Koraput and Hyderabad—manufacture airframe, engines and electronics. The advantages of Bangalore are the availability of cheap electric power, equable climate, central situation and remoteness from the sea-coast, existence of the Science Institute and the proximity of an iron factory. It has already become the largest aircraft manufacturing and overhauling organisation in the East. There are two divisions in the Hindusthan Aeronautics Ltd.,—one for manufacturing jet fighters and the other for jet engines. At Kanpur, a division of the HAL has been opened to manufacture aircrafts. Jamshedpur is also a potential site for the manufacture of aircraft.

[15]Till March 1968, the Visakhapatnam Shipyard from its inception had constructed 46 ships, totalling 374,536 DWT. During 1969-70, three cargo ships of 12,500 DWT each were built.

Automobile and Ancillary Industries

The development of automobile industry in India started in 1948, when the Government declared the automobile industry as of national importance. The automobile industry has helped the development of motor transport as a means of rapid communication for the movement of motor transport. In a vast country like India, motor transport as a means of rapid communication for the movement of agricultural produce and the distribution of manufactured goods can render great services. Therefore a well-established automobile industry has been the aim of a sound, progressive economy of the country.

The industry began with the floating of assembly plants in Calcutta, Bombay and Madras. *The Calcutta centre* was started in 1944 by the Hindusthan Motors Ltd. Today, the Company

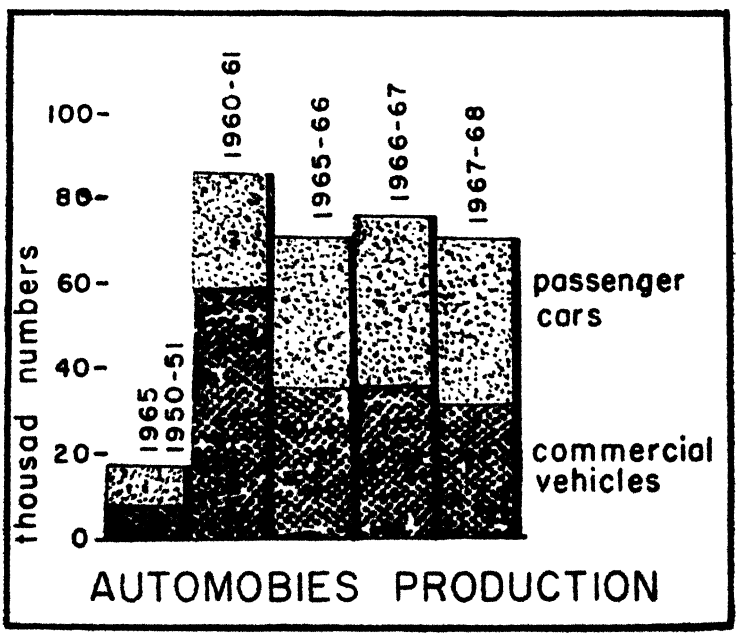


FIG. No. 102. Production of Automobiles in India.

manufactures trucks and motor cars and is linked up with Morris Motors, England and 'Studebaker' cars in India. A well-equipped factory has been built up at Uttarpara, near Calcutta, for assembly work. This factory has been manufacturing all the

vital components of the cars including castings and forgings. *The Bombay centre* was also started in 1944 by Premier Automobiles Ltd. This company is linked with the Chrysler Group of U.S.A. and manufactures cars and trucks. Bombay centre is now manufacturing the engine, the transmission assembly and shock absorbers. It is also making *radiators*, springs and universal joints. *The Madras centre* is making engines, and commercial vehicles of 5 tons and above. The other possible sites of the industry are Burnpur and Jamshedpur which, besides being near or in the heart of iron areas, can conveniently use imported machines and parts. As these centres are already noted for engineering industries, the supply of trained labour and of various parts for the automobile industry is available.

In 1969 India produced 43,600 passenger cars and 35,600 commercial vehicles compared to 20,000 passenger cars and commercial vehicles each in 1960-61. The rate of production was fairly high in respect of automobile production till 1965-66, and thereafter because of the difficulties in getting materials from abroad the progress has been almost halting.

	1960	1964	1966	1968	1969
(*i*) Passenger cars ...	20	36.8	39.6	38.7	43.6
(*ii*) Commercial vehicles . .	20	34	35.6	20.8	35.6

Mining and metal industries, chemicals, glass, leather, rubber and textile industries supply raw materials for the production of a finished motor car. In India, however, some of these basic and ancillary industries have not been properly developed.[16] Although it may not be possible for India to be self-sufficient in regard to all basic raw materials, India can at least be self-sufficient in steel and iron for automobile industry. India while manufacturing most of the parts necessary must import some parts for some time for the industry. The automobile

[16]The manufacture of automibile tyres and automobile tubes has received a tremendous boost from the development of automobile industry. In 1969, this industry manufactured 3.4 million tyres and 3 million tubes as compared to 0.90 and 0.80 million in 1950-51.

industry of India obtains about 80 per cent of the component parts of cars in India. The existing units in the automobile industry have long-term production plans which when fulfilled will meet the entire demand for cars and trucks. The automobile industry is a protected one.

Lac Industry

Lac is virtually a monopoly of India and is grown chiefly in Bihar, West Bengal, Orissa and Madhya Pradesh. The areas produce about 85 per cent of the total production. Chotanagpur in Bihar alone is responsible for 50 per cent of the total. In West Bengal lac is produced in Malda, Bankura and Purulia. The annual production of lac in the country is about 1 million maunds. *In its refined form, in which it is usually packed for export, it is known as shellac.*

The insect which produces lac is known as *Laccifer lacca*. It lives as a parasite feeding on the sap-juices of certain trees like Palas, Kusum, Ber, Kahir, Ghont and Arhar.

Lac yields two products—dye and resin. Lac dye trades are no longer important because of the discovery of the aniline dyes. It is now the resin for which lac is important.

Lac is used in a variety of industries. Between thirty and forty per cent of the total lac is consumed by the gramophone records industry; another thirty-five per cent is utilised by the sealing-wax manufacture, photographic materials, the confectionery trade, bangles, toys, shoes, dressings micanite, grinding stones, munitions and fireworks. A disquieting feature is the decline in the use of resin in gramophone records because of synthetic resin. There are about 500 small factories in India for processing sticklac into seedlac and other kinds, of which 400 factories are located in Bihar. Except for two factories in Calcutta, the processing is done by indigenous methods in all other factories. The two factories of Calcutta are highly mechanised. Calcutta is also the principal distributing centre for lac and lac products.

About 90 per cent of the production of shellac is exported to the United States of America, U.K., West Germany and Japan. America alone takes about 45 per cent of the total pro-

duction. The Government of India in the interest of export trade insists that lacs to be exported must conform to such quality standads as are generally accepted in the export trade in lac.

Although lac is a virtual monopoly of India, its position is by no means secure because of the introduction of synthetic products in foreign countries and also from the development in Thailand, Indo-China and Burma. Bakelite is now already used in the electrical trade. In the varnish trade, cellulose preparations are common.

Thailand is now producing more lac and is also refining it into shellac for direct export to the U.S.A. and other foreign countries. There is evidence, too, of improvement in the quality of the Thailand shellac and with all that its price is about two-thirds that of Indian shellac. Shellac factories have been started in Thailand for an annual output which is about one-third of India's production. Effective measures for improving the quality of the lac and extending shellac markets both in India and abroad have been taken in India. A Shellac Export Promotion Council has been set up, whose efforts have succeeded in improving the quality of products as well as exports.

The Indian Lac Research Institute at Namkum near Ranchi is concerned with devising improved methods of cultivation, improving the quality of lac, finding new uses for shellac and organising research in consuming countries in cooperation with the industries using lac.

The Cement Industry

The cement industry in India enjoys many natural advantages, such as abundant supply of limestone of excellent quality occurring in many parts of the country close to railway lines, suitable clay also close to railway lines, and the production of gypsum in the country. With regard to fuel, however, the industry labours under a considerable handicap as all the concerns are situated at long distances from the coalfields, and the shortage of coal on account of transport bottleneck is a very serious problem. The chief raw material for cement is limestone. About 1.6 tons of limestone are required to make 1 ton

of cement which contains 4 per cent gypsum and 38 per cent coal.

LOCATION OF CEMENT FACTORIES

Bihar ...	... Dalmianagar and Japla, Chaibasa, Sindri, Khalari (Ranchi), Kalyanpur and Sone Valley.
Madhya Pradesh	... Jabalpur, Gwalior and Katni.
Tamil Nadu	... Madhukarai (Coimbatore) Dalmiapuram (Trichinopoly), Mangalagiri (Krishna), Tirunelveli.
Punjab ...	... Bhupendra, Dalmia, Dadri.
Orissa ...	... Rajgangpur.
Mysore ...	... Okhamondal (Porbandar), Sevalia.
Gujarat ...	... Kottayam.
Kerala ...	... Sawai Madhopur, Lakheri.
Rajasthan	... Bangalore, Bhadravati.
U.P. ...	... Allahabad.
Andhra ...	... Bezwada, Hyderabad.

The industry is widely distributed but the production cost is comparatively low in centres where both limestone and power are available. In U.P., however, the deciding factor has been the availability of markets near at hand. In almost all States, the cement industry has developed. In the case of some States, the location of cement factories has been very favourable from the point of view of raw materials and markets. Non-availability of limestone of suitable grade near the location has been responsible for low production in certain factories.

The manufacture of cement in India was started as early as 1904 in Madras, although its production was negligible. The first World War gave impetus to the industry, and factories were started at Porbandar (Kathiawar), Katni (Madhya Pradesh)) and in Rajasthan. Since then the industry has progressed very rapidly, and the country has almost attained self-sufficiency. The cement industry is in a position now to meet the full requirements of the country. In 1970-71, the production of cement in India was 14 million tonnes compared to the capacity for 23 million tonnes.

The *per capita* consumption is still very low. The *per capita* consumption of cement in India is only 27 lbs. compared to 41.1 lbs. in England, 516 lbs. in U.S.A., 740 lbs. in Sweden, 716 lbs. in Belgium, 460 lbs. in Denmark and 90 lbs. in Japan. The production target for cement for the Fourth Plan is 20 million tonnes.

India is also developing a small export trade in cement, and the buyers are Iraq, Ceylon and Indonesia. The countries around India and the Persian Gulf as well as those to the south - east of India can be supplied with cement by India at competitive rates on account of her favourable position from every point of view. Besides, these countries too have development programmes for which they will require cement. As the sources of raw materials are not located at convenient places, the cost of transport becomes heavy. In future it will be necessary to devise ways and means to utilize low grade lime stone so that more areas can manufacture cement.

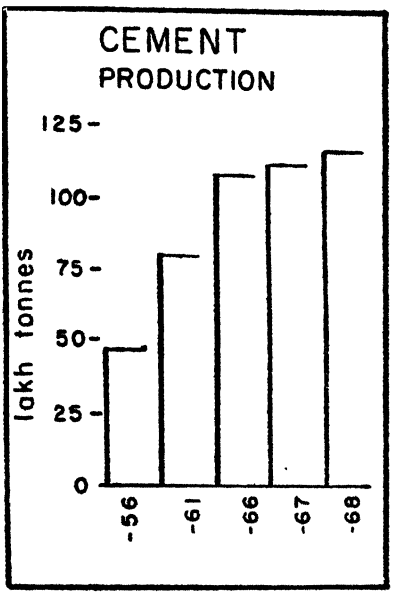


FIG. NO. 103. Production of Cement in India. In 1968, the production was 10 p.c. more than that of 1966.

Pozzolana, a type of cement, is being manufactured at Bhakra Dam to replace cement for purpose of concreting. Pozzolana is made of shale which is available in abundance near the Dam site.

There are about eleven companies which control the production of cement in India. The Associated Cement Companies Ltd. is the single largest manufacturing group. The next is the Dalmia group which runs five factories with a rated capacity of 9 million tons. There are nine other individual companies. The Government of India has set up the Cement Corporation

of India as a Government owned company in order to do surveying, prospecting and proving of limestone companies in the country.

Match Industry

At present India has about 65 match factories. The industry employs about 25,000 workers. The match factories are located in Gwalior, Hyderabad, Dhubri (Assam), Kota (Rajasthan), Shimoga (in Mysore), Petland (in Baroda), Tiruvattiyur, 27 km. from Madras, Calcutta and Trivandrum.

The expansion of the industry depends upon the adequate supply of suitable types of wood and raw materials like sulphur and phosphorus. The Indian match industry consumes over 6 million cubic feet of wood every year. Andaman Islands are an important source of wood for the Indian match industry. Sulphur and phosphorus are, however, imported.

Small-scale and Village Industry

The country has fully recognised the importance of small-scale and village industries in providing employment. With more than 20 million persons directly associated, the small-scale and village industries occupy a prominent position in the economy of the country.

From the point of view of size and location, the small-scale and village industries may be classified as follows:

(*a*) Handicrafts.
(*b*) Small-scale Industries.
(*c*) Village Industries.

India has always been famous throughout the world for her handicrafts. The handicraft industries are commonly located in rural areas, and the products are made for markets with which the individual producers have direct touch. Rugs and carpets, ivory products, bidi works, toys, brass works, wood works are certain products which have wider demand in the country. Of late, some of the artistic products of the handicraft industries are being exported outside.

The small-scale industries work for a large market, inside and outside the country and aim at simplifying and standardising their production. Some of the small-scale industries use machine, power and modern techniques.

All units or establishments having a capital less than Rs. 5,00,000 and employing less than 50 persons when using power come within the scope of small-scale industries. The small-scale industries are located in "urban" areas and their development has become the responsibility of the States. The products are bicycles and parts, sewing machines and parts, agricultural implements, hand tools, locks, sports goods, utensil, diesel engines and parts, storage batteries, leather footwear, electric fans, trunk manufactures, drugs, soap, electroplating, etc. With a view to providing conditions favourable to productive efficiency, maintenance of quality standards in production and economic utilization of materials and equipment by small-scale industries, the Government has opened about 100 *industrial estates* in the country. The idea of opening industrial estates is to promote the expansion of small-scale industries on uptodate lines by providing built up factory accommodation on hire purchase or outright purchase or on a rental basis with other facilities like water, electricity or gas. Most of the estates are located near small and medium-sized towns. A few have been established in rural areas. East estate provides workshop space, electricity, water and transport facilities to a number of small-scale industrial units. Being located near one another, the units can use the equipment and services of one another. The owners of small units can also buy machinery on hire-purchase system through the *National Small Industries Corporation* which also arranges for the purchase of products from the small units on Government contract. Small-scale units can be developed as ancillaries to large industries for the supply of components and parts to them. In fact, in several industrial estates the small units are functioning as ancillaries to large industrial undertakings in Mysore and Maharashtra.

A village industry has the characteristics of both handicrafts and small-scale industry. Such an industry is carried on wholly with the help of members of the family, and not hired labour, either as a whole-time or a part-time occupation. The distinct feature is its location in the home of the persons and

not outside though it may use certain technical and organisational methods of handicrafts and small-scale industries. As a village industry is usually associated with agriculture, its geographical location is "rural". The typical village industries are hand-pounding of rice, vegetable oil (ghani), ghee, tanning, gur and khandsari.

Handloom industry is of tremendous importance, as it supplies more than one-third of the cloth produced in India. In fact it is as widely spread as agriculture. More than 1,000 million yards of cloth are produced annually by the handloom industry which also consumes about 700 million yards of yarn. By consuming large quantities of yarn, the handloom industry has become an indispensable market for cotton mill industry. The chief feature of the handloom industry is the fact that it specialises in the production of a variety of cloth, the market for each of which is limited. Consequently, the mills find it uneconomical to manufacture such products. Hand-spun yarn from *Charka* is being used more extensively by the handloom industry. It is estimated that about 200 million yards of cloth are produced annually from hand-spun yarn (khadi).

The problems of small-scale and village industries are (*a*) the lack of raw materials of good quality, (*b*) out moded implements, (*c*) defective marketing, (*d*) lack of finance, (*e*) high cost of production and (*f*) lack of technical knowledge.

SOME NOTABLE VILLAGE INDUSTRIES

Assam	...	Handloom (cotton and silk), basketry
C. P.	...	Gur and khandsari; handloom; vegetable oil; carpet; handicrafts
Kerala	...	Coir spinning and weaving
Tamil Nadu	...	Handloom (silk and cotton)
Rajasthan	...	Utensils, stone work, handloom (cotton); handicrafts
Orissa	...	Handloom; handicrafts
Bihar	...	Handloom (silk and cotton)
Punjab	...	Handloom (wool) sports goods; ghee
West Bengal	...	Handloom (cotton and silk); hand pounding of rice; handicrafts
Madhya Pradesh	...	Handloom (cotton and silk)

Andhra Pradesh	...	Carpet ; handloom ; handicrafts
Maharashtra	...	Tanning ; khandsari ; handloom ; handicrafts
Gujarat	...	Ghee ; handloom ; handicrafts.

It will thus be observed that handloom and handicrafts are the most common occupations in rural areas of India. Behind their common pattern of production, regional characteristics of taste and tradition are reflected in their products like shawl of Kashmir, carpet of Mirzapore, brass work of U.P., saries of the South and West Bengal, ivory of Mysore, etc.

Coir yarn and manufactures, handloom fabrics and handicrafts are exported to the U.S.A., U.K., West Germany, and other European countries. The products of small industries like cotton hosiery, sports goods, light engineering products, etc., have great scope for export. It is, however, essential that more attention is paid to improvement and standardisation of quality, reduction of cost, introduction of new designs and proper organization of production.

13. Facilities of Transportation

An efficient and well-developed system of transport is vital for the rapid industrialisation of India. The efficiency of transport depends on its speed, safety, dependability and cheapness. Since heavy demands have been placed on the transport by India's developing economy, it is essential that the capacity of transport is increased. Normally, in all advanced countries the transport capacity is higher than the growth of industrial capacity. In India, however, the position is reverse and many industries suffer on account of transport bottlenecks from inadequate provision.

About 25 per cent of India's industrial capacity remains unutilised because of shortage of raw materials, power, spare parts and transport. "It would not be surprising if transport were responsible for at least a fifth of current under-utilisation." Though there has been an increase of 100 per cent in the ton/km worked by Indian Railways and 200 per cent on the roads over the decade from 1951 to 1968, the Indian industry

has still the major problem of stock-piling finished goods or running short of raw materials.

Transportation in India can be divided into four heads: (*i*) railways, (*ii*) roads, (*iii*) waterways, and (*iv*) airways.

Railways

Railways play a vital role in the economy of India. It is on railway system that the efficient functioning and growth of India's economy depend. The Indian railway system is by far the largest in Asia and the second biggest State-owned enterprise in the world. The Indian railways employ more than 1 million persons. Originally railways were built up in India for military purposes. The frequent visitations of famine also necessitated the extension of railways. The railways have brought about an equalisation of prices throughout the country. The rapid industrialisation of the country is largely the result of railway developments; it has fostered agricultural production and encouraged the establishment of industries. The mining industry, in particular the coal industry, owes much to railways.

The Indian railways carry more than 80 per cent of the goods traffic and 70 per cent of the passenger traffic of the country.

The physical and geographical conditions for operation of the railway network in India are most favourable in the Gangetic basin which is an enormous plain of dense population. The mountains in the north and the Western Ghats present considerable difficulties with regard to the construction of railway lines. The Satpura and Vindhya ranges are low, and the railway lines can by-pass the big ranges or cross them by means of tunnels. The Thar desert in Rajasthan with scanty population and the high mountains in Kashmir make railway operation difficult. Large rivers which have strong currents present difficulties in the construction of bridges. Many rivers also give rise to floods during the monsoon in U.P., Bihar, West Bengal, Orissa and Assam. The railway routes have therefore been constructed along areas which offered least physical resistance. Thus, in India the railway-route pattern has been very much influenced by the forces of economic geography.

Railway lines operate on three gauges: 5'6", 3'3⅜" and 2'6". The frequent changes of gauge and the scarcity of bridges across some of the bigger rivers are still the main drawbacks of the Indian railway system. In 1970, India had 60,137 km of railway lines.

Since the demand for various kinds of materials is on the increase because of the development of industries, there has been a considerable amount of pressure on railways. Consequently, there is always delay in the movement of goods from industrial areas to distributing areas. Except in the case of food grains and jute manufactures, where their dependence on railways is only to the extent of 20 p.c. of the total movements, there are many key industries which depend entirely on the railways for the movement of their respective products. The magnitude of the dependence of certain industries on railways is as follows:

RAILWAY MOVEMENT OF TOTAL PRODUCTION

(in percentage)

Coal	95	Raw jute	90
Cement	90	Tea	98
Iron & Steel ...	100	Paper	96
Manganese ore ...	98	Jute manufactures ...	20
Foodgrains	15	Raw cotton	75
Sugar	50	Cotton Textiles ...	70

India requires more railway km in order to provide quicker movement of wagons, and relieve congestion in certain sections. There is also the problem of rail-road competition in certain regions which has diverted high-rated traffic to road transport. The country requires planned development of transport. Even though India needs more roads and railways, there should be some coordination between them so as to avoid wasteful competition.

The application of electricity as a source of power on the railways in India is as yet slow. The first electric traction came into use in 1928 when Bombay suburban areas were operated by steam. The Bombay Suburban service installation was followed by

the electrification of main lines between Bombay and Poon (170 km) and Igatpuri (125 km). As a rule, electric locomotive are more powerful and can cope with gradients as well as heav loads. Because of the design, such trains can run through mor soon flood water 8 inches above rail level. In 1932, the electr fication of Madras suburban service came into operatior Calcutta-Mughalsarai line started operation in 1965. A tot route kilometrage of 3,500 was electrified up to March 197(During the same period, diesel traction was adopted over 13,5 route kilometres.

The present railway lines of India are grouped into nin zones

1. Northern Railway.
2. North-Eastern Railway.
 Eastern Railway.
 Western Railway.
 Central Railway.
6. Southern Railway.
7. South-Eastern Railway.
8. North-East Frontier Railway.
9. South-Central Railway.

The formation of these railway zones proceeded on th belief that in a vast country like India, there are areas whic have common economic interest and other natural affinities trade and that such areas if they are contiguous must have railway zone. Before the zone-system was introduced, there w 38 railway systems in India. The zone system has facilita better economy and efficiency in administration.

1. *The Northern Railway* with 10,463 km. serves Punj Haryana, Delhi, northern and eastern Rajasthan and Ut Pradesh up to Mughalsarai. Of the total km. *broad ga* accounts for 6,881 km., *metre gauge* 3,322 and *narrow ga* 260 km. The headquarters is in Delhi. The principal li which are in broad gauge are :

 (*i*) Amritsar-Mughalsarai *via* Jullundur, Ambala, Sa ranpur, Moradabad, Bareilly, Lucknow and Va nasi. The route is 1000 km long, and handle

large amount of passenger traffic. There is a connecting line between Saharanpur and Delhi. From Amritsar, a line goes to Pathankot for Kashmir.

(*ii*) Delhi-Ferozepur *via* Bhatinda. Distance 360 km.

(*iii*) Delhi-Kalka *via* Ambala. From Kalka a narrow gauge line goes to Simla.

(*iv*) Delhi-Mughalsarai *via* Aligarh, Kanpur, Allahabad and Mirzapur. The line is 650 km long.

The metre gauge system connects Delhi with Bikanir, Jodhpur, Anupgarh and Pokaran.

2. *The North-Eastern Railway* with more than 1973 km serves the northern part of Uttar Pradesh, and Northern Bihar. The headquartes is at Gorakhpur. The line operates in a well-developed agricultural region and carries large quantities of sugarcane, tobacco, tea and rice. The principal railway lines are noted below:

(*i*) Agra-Kanpur-Lucknow to Katihar *via* Gorakhpur, Chapra and Muzaffarpur. The length of the entire route from Agra to Katihar is 1100 km. In 1950 a new line was constructed to connect Katihar with Siliguri. Siliguri was already connected with the main line serving Assam. A new line was laid from here to Fakiragram.

(*ii*) Several branch lines between (*a*) Lucknow and Bareilly, (*b*) Bhatni and Allahabad, (*c*) Chapra and Varanasi.

3. The *North-East Frontier Railway* has its headquarters at Pandu. This zone was opened in 1958 out of a part of North-Eastern Railway. Its total km is 3620, of which metre gauge accounts for 3,632 km. The main lines of the N.E.F. Railway are :

(*i*) Maniharighat to Amingaon *via* Katihar, Siliguri, Alipur Duar. The distance is 409 miles.

(*ii*) Pandu-Gauhati-Tinsukia—distance 325 miles.

(*iii*) Several branch lines like Ledo-Dibrugarh, Katihar-Jogbani.

4. *The Eastern Railway* with 4,132 km of line serves the Eastern Gangetic region between Mughalsarai and the Hooghly, West Bengal. The zone has 4013 km of broad gauge and 28 km of metre gauge. Its headquarters is at Calcutta and it handles the largest amount of goods traffic. It is one of the most important goods and passenger carriers. Approximately half of the freight movement of this line is coal, followed by iron ore manganese, jute, mica and other products. Throughout the Eastern Gangetic plain, this railway line performs highly varied economic services. The tremendous volume of traffic is accounted for by the fact that the Hooghly basin along with Durgapur and Sindri has a very large industrial base. Besides, Calcutta as a port has both export and import trade.

The principal lines are :

(*i*) Howrah-Mughalsarai *via* Gaya and Dehri-on-Sone.

(*ii*) Howrah-Mughalsarai *via* Patna. Distance 625 km Both these lines proceed to Delhi, Saharanpur and beyond by the Northern Railway.

(*iii*) Howrah-Kiul *via* Barharwa, Sahibganj, Bhagalpur and Jamalpur. Distance 370 km.

5. *The South-Eastern Railway* with 6,282 km serves the mining areas of South-West Bengal, Orissa and parts of Madhya Pradesh. The headquarters is at Calcutta. It has 6,522 km of broad gauge lines and 1,405 km of metre gauge. The principal lines are :

(i) Howrah-Nagpur via Kharagphur, Jamshedpur, Bilaspur, Raipur. Distance 1,003 km.

The Nagpur line crosses the rich mineral areas and handles the substantial portion of the traffic composed of manganese, coal, iron ore, etc Jamshedpur—the most important iron and steel centre of India—is on this line. A number of feeder lines has been constructed to connect Jamshedpur with the manganese and iron fields of Bonai, Keonjhar and Singhbhum.

(*ii*) Howrah-Waltair *via* Balasore, Cuttack, Berhampur, Vizianagram. Distance 790 km. This line proceeds to Madras.

There is a very important line which has connected Raipur on the Howrah-Nagpur line with Waltair. Much of the goods traffic of Madhya Pradesh and Orissa passes through Waltair for export. This Railway which was previously known as the Bengal-Nagpur Railway normally carries 20 million passengers and 18 million tons of goods.

Traffic by diesel motive power is also carried on 400 km. of railway lines in Asansol-Jharsuguda area.

6. *The Western Railway* with more than 10,242 km of lines serves Maharashtra, Gujarat, Rajasthan, and Madhya Pradesh. The line serves the great industrial areas of Bombay, Ahmedabad and Baroda and handles tremendous quantities of cotton. This line handles about 12 million tons of goods and 9 million passengers. The headquarters is in Bombay.

Principal lines in broad gauge are : (2,636 km.).

(*i*) Bombay-Delhi *via* Surat, Baroda, Ratlam, Nagoda, Bayana, Bharatpur and Mathura. Distance 1,300 km. Bayana is connected with Agra and Kanpur.

(*ii*) Bombay-Ahmedabad *via* Surat and Baroda. Distance 450 km. Surat is connected with Bhusaval and the latter with Nagpur.

Principal lines in metre gauge are : (6,118 km.)

(*i*) Ahmedabad-Delhi *via* Abu Road, Beawar, Ajmer, Jaipur and Alwar. Distance 800 km. Ajmer is connected with Khandwa.

(*ii*) Porbandar-Dhola : Rajkot-Veraval ; Kandla-Bhuj ; Surendranagar-Okha.

It is proposed to double 250 km of railway lines between Ratlam and Nagoda, Baroda and Anand, and Godhra and Ratlam. The traffic will be carried by diesel motive power on 170 km of lines between Ahmedabad and Abu Road.

7. *The Central Railway* with more than 8.911 km of line serves Madhya Pradesh, parts of Andhra and Madras. Bombay is the headquarters of the Central Railway. Broad gauge

accounts for 6,042 km. metre gauge 1,546 and narrow gauge 1,167 km.

The principal lines are as follows :

(*i*) Bombay-Delhi *via* Bhusaval, Khandwa, Itarsi, Bhopal, Jhansi, Agra, Mathura, (1,400 km.). Itarsi is connected with Nagpur and Allahabad.

(*ii*) Bombay-Raichur *via* Poona and Wadia, (650 km). The line proceeds to Bangalore.

(*iii*) Delhi-Bezwada *via* Itarsi, Nagpur, Wardah and Kazipet. The line proceeds to Madras. Kazipet is connected with Hyderabad.

This line handles cotton and manganese of Madhya Pradesh and timber of Bhopal. Normally it carries 50 million passengers and 11 million tons of goods annually. The headquarters is in Bombay.

About 300 km of railway lines are being doubled between Delhi and Agra, Katni and Jabalpur and Jabalpur and Itarsi. There will also be electrification between Igatpuri and Bhusaval.

8. *The Southern Railway* has been formed by the amalgamation of Mysore Railway, the Madras and South Marhatta Railway and the South Indian Railway. Its total length is about 7,273 km. This railway system has 6,759 km metre gauge and broad gauge 3,305 km. It serves the densely populated and fertile areas of Madras, Mysore, Kerala and parts of Southern Bombay. The headquarters is in Madras.

Principal lines in broad gauge :

(*i*) Madras-Raichur *via* Cuddappa. Distance 400 km. This line connects Madras with Bombay.

(*ii*) Madras-Bangalore. Distance 340 km.

(*iii*) Jalarpet-Mangalore *via* Salem, Erode, Coimbatore, Tellicherry. Distance 630 km. Jalarpet is connected with Bangalore and Ootacamund.

Principal lines in metre gauge are :

(*i*) Poona-Harihar. Distance 630 km. This is an alternative route to Bombay from Madras. The line goes to Bangalore from Harihar.

(*ii*) Guntakal-Masulipatam *via* Bezwada. Distance 470 km.

(*iii*) Madras-Dhanuskodi *via* Tanjore and Tiruchirapalli. Distance 640 km.

(*iv*) Madras-Trivandrum *via* Tiruchirapalli, Virudhanagar, Madurai and Quilon. Distance 750 km. From Virudhanagar a line goes to Tuticorin.

These lines lead to several ports like Madras, Cochin, Tuticorin, Alleppey, Quilon and Kozhikode. Grain, cotton, oilseeds, salt, sugar, tobacco, timber and hides are the chief commodities handled. 603 km. of railway lines are being doubled between Arkonam and Jalarpet, Bezwada and Gudur, Jalarpet and Erode and Arkonam and Renigunda. 390 km. of the metre gauge will also be converted into broad gauge. The Madras-Villupuram line of 150 km will soon have electrification.

9. *South Central Railway* was opened in 1966 with a route kilometrage of 6,159. The main lines of broad gauge are from Secunderabad to Poona, Hyderabad to Kazipet, Balharshah to Vijayawada and Madras to Waltair. The headquarters is at Secunderabad.

Road Transport

In 1969, India had a total of 992,440 km. of roads compared to 388,226 km. in 1947. In terms of area and population, the total road length of the country works out to 28 km. for every 100 sq. km of area. The backwardness of India's road system can be judged from the fact that 175 km. of roads serve 100,000 population compared to 2,700 km. in the U.S.A., 1,400 km in France and 600 km. in U.K.

There are two principal reasons for the present shortfall of road transport in India : (*a*) deficiency of roads, qualitatively and quantitatively, and (*b*) non-availability of an adequate num-

ber of vehicles. Of the total roads, only 342,940 km are surfaced. Of the surfaced roads, 70,000 km. have asphalt or concrete surfacing and the rest have broken stone surface. About 62 per cent of our roads are village tracks which cannot be used during the monsoon, when these tracks are turned into mud and pools of dirty water.

Importance of Roads in India's Economy

Many fertile tracts of land are well served by rivers, and are potentially rich in agricultural wealth but they remain undeveloped for want of roads. The future road system in the country should be well balanced with regard to the needs of rural as well as urban areas and should take into consideration not only the future trends in traffic but also (1) the needs of semi-developed and undeveloped areas, including forest areas, in addition to the needs of highly developed and agricultural areas; (2) location of administrative headquarters, places of pilgrimage, health resorts, tourist centres, universities, and cultural centres; (3) location of industries, important commercial centres, big railway junctions, and ports; and (4) the strategic needs of the country.

Big cities in India are now the nerve centres of economic activity. Because of the enormous and fast increasing volume of traffic, the roads connecting the metropolitan areas have become highly congested resulting in delay in the movement of goods. It is high time that in India location and construction of highways are planned in advance to meet the increased economic activities of metropolitan areas, and at the same time to help serve the rural areas.

Because of industrial and agricultural development programmes, the amount of internal traffic has increased considerably, the burden of which the railways alone cannot cope with. Roads will have to carry most of the traffic in the subsidiary routes. "India not only requires more roads, but the existing ones should also be improved. She needs more bridges too, for a good road loses its value if some unfordable river or stream lies across it."

The inadequacy of vehicles is another handicap of road transport in India. The density of vehicles per km. of road in

India is about 1 compared to 21 in U.S.A., 25 in U.K., 13 in Malaysia, 8 in Ceylon and 6 in Philippines. In a country like India whose economy is expanding, the density of motor vehicles per km. of road should be constantly increased to cope with the demand.

The roads of India may be classified into four categories: (*a*) National Highways, (*b*) State Highways, (*c*) District roads and (*d*) Village roads. The National Highways or the trunk roads are the main cross-country roads.

The State Highways are the main arteries of commerce within the States. In respect of such road mileage Tamil Nadu heads the list with 27,115 miles of road compared to 13,400 miles in Maharashtra, 7,776 miles in U.P., 7,535 miles in Madhya Pradesh and 7,000 miles in Punjab. *The district and village roads* carry the traffic into the interior and serve the needs of the rural areas by linking them with the railways and highways.

The need for a good system of *national highways* in the country for integration in the national interest has become very urgent. The development of national highways has become the responsibility of the Central Government. There are at present 40 national highways with a total of 24,020 km. of which the following are important :

(1) Calcutta to Delhi via Varanasi and Kanpur (1,503 km.).
(2) Varanasi to Kanyakumari via Madurai (2,372 km.).
(3) Madras to Bombay via Bangalore (1,240 km.).
(4) Bombay to Delhi via Jaipur (1,436 km.).
(5) Calcutta to Bombay via Nagpur (1,654 km.).
(6) Poona to Vijayawada via Hyderabad (801 km.).

Many of these national highways have been made long by connecting the missing links and constructing bridges over big rivers. A long-term plan has been worked out to have an increase of National Highways to 48,000 km. by 1980 in order to provide "a grid system over the entire country so that no places will be more than 60 to 90 km. from a National Highway". Already, India has the largest National Highway network in the whole of Asia.

Some important projects which are under construction on the national highways are the Calcutta-Siliguri road, the Penner

bridge on the Madras-Calcutta road, and the Brahmani, Baitarani and Subarnarekha bridges in Orissa on the Bombay-Calcutta road.

Plans and Problems

A new 20 year plan has been formulated to bring every village within 6 km. of metalled road and 2.5 km. of any road.

One serious defect is the slow speed of road construction in India. Most of the operations in road construction today are carried out by manual labour. Mechanisation will not only increase the speed of construction but will also give economy in materials and overhead costs.

The Frontier Routes

Dense forests, high mountains and deserts hinder the progress of land frontier routes on the north. There is no through railway lines from India to her frontier countries except Bangladesh on the south-east and Pakistan on the west.

There is a road which goes from Leh in Kashmir to Tibet and Sinkiang. This is one of the hardest routes in the world, as it includes the Karakoram Pass (18,000 ft.). There are good roads between India and Nepal.

From Ledo in North-East Assam the road which runs to China through Burma assumed great importance during the Second World War. The route is known as the Stilwell Road (formerly the Ledo-Burma Road). From Ledo, the route proceeds towards the south and reaches Bhamo *via* Myitkyina. A separate road also reaches Bhamo from Lashio. From Bhamo the route goes towards the east and after traversing a series of high mountains reaches Kunming *via* Paoshan. The distance between Ledo and Kunming is 1,600 km. The same road continues for 1,500 km. to reach Chunking.

Inland Navigation

Inland water transport in India today is of minor importance, its goods traffic in terms of ton-kilometres being only one per cent of that of the railways. The steamer traffic on inland

waterways in India at present carries an estimated volume of $2\frac{1}{2}$ million tons only in traffic.

The river traffic of India can, however, be made very important in the transport system as it possesses a tremendous freight capacity. In India, the railways cannot meet all the demands of transport. Several vital commodities require prompt transport. Often industries are held up and production slowed down for lack of an even flow of raw materials. With many industrial development plans now on the anvil, the transport bottleneck is likely to get worse. A planned and co-ordinated development of cheap water transport is one of the principal solutions for the national problem. Both in the interest of long-range development and the over-all economy of the country, water-transport claims a national responsibility. Water transport in India has all the time suffered from the drawback that it has been a provincial subject. The lack of a unified policy and control of integrated care and development and the restrictions on inter-State movements of traffic in the past impeded its growth. The treatment of a river as a unit, irrespective of regional boundaries, enables its rational development in the form of extension of navigational channels, co-ordination between railways and water transport, proper apportionment of traffic between road, river and rail, and the enforcement of common commercial policies. The development of inter-State rivers and waterways, therefore, has now become the responsibility of the Central Government.

The great disadvantage of the rivers of India is that they usually enter the sea in shallow, sandy delta-mouths, instead of broad and deep estuaries, which, in other countries, offer a pathway for ships and commerce far into the interior. One of the main causes for the decline of navigation has been the almost complete withdrawal of the dry-weather flow of the rivers, for irrigation in their upper reaches with hardly any water left for navigation below. Besides, there is a large number of rivers in the country whose dryweather discharges are so low that navigation is not possible for the most part of the year.

Because of the presence of large rivers with their tributaries which are all navigable, the north-east region comprising Assam, West Bengal and Bihar has developed a good system of water-

ways.[17] In the south, the waterways in Kerala connect several minor ports and the major port of Cochin. Inland waterways in the deltaic region of Orissa provide an important means of communication. Tamil Nadu and Andhra Pradesh have also inland water transport in a limited way.

The length of navigable waterways in India is over 14,000 km. of which 3,500 km. are navigable by steamers and the rest by large country boats. It is estimated but about 7,000 km. of river routes in India could be made navigable by steamers. However, at present, the Ganga and the Brahmaputra carry the largest part of the river traffic.

The Ganga which is the most important river of India, is 2,900 km. long, and for about 750 km. from its mouth, it maintains a nearly uniform depth of about 30 feet, and therefore, steamers move up to Patna, although country boats proceed as far as Hardwar. The Ganga has lost much of its importance as a highway of commerce because of the overwhelming importance of the railways. On the Ganga, steamers used to ply as far up as Garmukteswar about 600 km. above Allahabad even as late as 1854. The river is now navigable up to Buxar (near Patna). There is a plan to make it navigable once more up to Allahabad.

The important towns on the Ganga are Hardwar, Kanpur, Allahabad, Mirzapore, Banaras, Ghazipur, Patna, Monghyr, Murshidabad and Calcutta, while on the Jumna the chief towns are Delhi, Mathura and Agra.

The **Brahmaputra**, about 2,700 km. long and has its source at a height of nearly 16,000 feet, a little east of Lake Manasarowar in Tibet. Flowing eastwards along the foot of the northern slopes of the Himalayas, it enters Assam and takes a sharp bend towards the south-west. After traversing the entire length of the Assam valley, the Brahmaputra again bends towards the south and joins the Ganga at the south-eastern corner of the Pabna district in Bangladesh.

[17]For long, the trade and commerce of Northern India had been much facilitated by the abundance of navigable streams and the flat relief of the region. Before the advent of the railways, the rivers of northern India handled a considerable portion of the country's inland trade. But inland navigation received a great set-back with the development of railways.

The Brahmaputra was important for carrying Assam oil, tea, timber and jute which were brought to Calcutta by a fleet of vessels whose total carrying capacity was 156,000 tons till recently. "Between both the destinations the volume of cargo carried on this route per year was of the order of about 1 million tons." With the emergence of Bangladesh as an independent state and with the friendly relations between India and Bangladesh, through navigation between Assam and West Bengal via Bangladesh will again assume importance.

There are certain drawbacks in the river which make navigation dangerous: (*a*) formation of new islands, sandbanks and shoals, and (*b*) the presence of a very strong current during the rains. The rich deposits of silt as the result of floods every year make agriculture very productive in the Brahmaputra basin. In agricultural and commercial utility, the Brahmaputra ranks next to the Ganga.

The principal rivers of Peninsular India are the Narmada, Tapti, Mahanadi, Krishna and Kaveri. Of these, the Narmada and the Tapti flow towards the west coast. Owing to the greater height of the Western Ghats, the other rivers flow towards the east. As the rivers are rain-fed, navigation except in the lower reaches, is not possible during the dry season. The lower courses are navigable in the rainy season.

There are only a few navigable canals in India, the most notable being (*i*) the Circular and Eastern Canals in West Bengal, (*ii*) the Ganga Canals running from Hardwar to Kanpur extending over 400 km., (*iii*) the Buckingham Canal running parallel to the east coast in Tamil Nadu and Andhra over a distance of 380 km., (*iv*) the Orissa Coast Canal and (*v*) the West Canal in Kerala.

In the Godavari and Krishna deltas the navigable canals are the main waterways. The backwaters are also important on the west coast between Cochin and Quilon as waterways. The canals and the backwaters along the Malabar Coast provide 4,000 km. of waterways.

The need for waterways in India is great. In spite of physical difficulties, much improvement can be made in the existing waterways of the country. Navigation can be developed on shallow stretches of rivers by deepening the channels, by dredg-

ing and by the use of such crafts which can ply on such stretches. If the waterways of India can be systematically organized and exploited, they can become equal partners to the railways in addition to their use for irrigation purposes.

There is a scheme to have in course of time a national network of waterways which will serve the different regions of the country as well as make for continuous east and west coasts navigation by connecting (*a*) the Ganga system with the Narmada, (*b*) the Narmada with the Godavari system and (*c*) the Tapti with the Godavari system through the Wardha river. There are good possibilities of developing traffic on waterways in (*i*) the Ganga from Buxar to Allahabad, (*ii*) Gogra up to Bahramghat, (*iii*) Tapti up to Aorakpur, (*iv*) Bhagirathi, (*v*) Mahanadi and Orissa Coast Canal, (*vi*) Buckingham Canal, and (*vii*) Tapti up to Kakvapa and 75 km. above. A Ganga-Brahmaputra Water Transport Board has been set up to carry out development works in regard to inland water transport in the Ganga-Brahmaputra region.

Shipping and Sea Routes

In view of the fact that foreign trade is a key factor in the economy of the country, Indian shipping has a special role. To a large extent, India's prosperity is linked with shipping. India has a coastline of over 5,689 km. and merchant ships from all important maritime countries call at her ports. The sea-routes radiate mainly from the eight major ports of Calcutta, Kandla, Vishakhapatnam, Madras, Bombay, Cochin, Mormugao and Paradip. The vast coastline also makes it possible to use Indian shipping for internal trade. Besides, Indian shipping provides foreign exchange earnings to the tune of Rs. 60 crores out of an investment of Rs. 300 crores. In 1970, India had 254 ships of which 167 were on the overseas trade and 87 on the coastal trade.[18]

[18]In 1947 when India got independence, her share in the overseas trade was almost nil. Today, Indian shipping has cargo and passenger services with European countries, U.S.S.R., U.S.A., East Africa, Australia, Japan and Far East, taking a share of 14 p.c. of the overall overseas trade. The use of foreign vessel means an enormous outflow of foreign exchange. Since 86 p.c. of our overseas trade is handled by foreign vessels, the need for developing our shipping has become urgent.

India has a place of pride in the maritime nations of the world. It is the second largest ship-owning country in Asia. Although her place is sixteenth among ship-owning countries of the world, she is also one of the biggest ship-owning nations in the world.

Principal Shipping Routes

The Suez route before its closure was responsible for handling more than 75 per cent of India's exports and imports and was mainly concerned with maintaining India's trade relations with Europe.

The Cape route connects India with South Africa and parts of West Africa. Sometimes steamers proceed along this route from India to South America. The imports coming into India by this route are cotton, spices, and hides and skins.

The Singapore route is second to the Suez route in respect of volume of traffic. This route connects India with South East Asia. The route also maintains India's trade relation with the Western coast of U.S.A., Canada and New Zealand. The imports coming into India through this route are cotton and silk manufacturers, iron and steel, machinery, porcelain, timber, dried fish, graphite etc. The exports from India are chemicals, pig iron, manganese, jute, shellac, mica, plastic goods, toys, engineering goods etc.

The Australian route is gradually becoming important. It connects India with Australia. The imports coming into India are wheat, raw wool, horses, canned fruits, provisions, etc. The exports from India are jute, tea and linseed. The chief ports of Australia engaged in maintaining trade relations with India are Brisbane, Sydney and Melbourne.

The coastal shipping is as yet a weak limb of the Indian transport system. Through the maritime states in India possess good sea board and many good harbours, the level of economic development in the different hinterlands does not at present ensure an increasing volume of cargo. The coast-wise transport is reserved for Indian-owned shipping, but, even then, foreign ships are required to participate in the trade during periods of peak cargo offerings. The wet cargo like oil is handled mainly

by foreign markets, and the share of Indian tankers is only about 20 p.c.

Indian shipping carries now 50 per cent of the cargoes moving along India-Burma and India-Ceylon lines, and maintains regular cargo services in the Indo-U.K.-Continent, India-Malaysia, India-U.S.A. and India-Australia trade. With a view to inspiring confidence in the Indian companies which are engaged in overseas trade, the Government formed two shipping corporations in co-operation with the existing Indian Shipping Companies. The Eastern Shipping Corporation which was set up in 1950 as a Government sponsored corporation, operated services between India and Australia, India and Far East, India and East Africa, Madras and Singapore and Calcutta/Madras and Andamans. The second corporation—The Western Shipping Corporation—was set up in 1956 to strengthen the Indian fleet operating on the overseas routes to Persian Gulf, Red Sea and U.S.S.R. and Poland. In 1961, the Shipping Corporation of India Ltd. was formed by the merger of the two corporations. The Government reconstituted a National Shipping Board in 1965, to advise on all matters relating to Indian shipping including specifically the problems of development of shipping in future.

The broad objectives of Shipping Plan are (*a*) to cater fully for the needs of coastal trade with due regard to the possibility of diverting some traffic from railways to coastal shipping; (*b*) to secure an increasing share of India's overseas trade for Indian ships, and (*c*) to build up the nucleus of a tanker fleet. The building up of Indian merchant navy is one of imperative economic necessity.

Indian shipping is not without threat by competition from advanced countries. Indian fleet is small in size and obsolete in design, and needs to be modernised. Since our ports have limited facilities, the manufacture of modern and bulk carriers is a problem. Indian ports have to be expanded to cater to bigger ships.

Development of Air Transport

Air transport in India has come to occupy a place of increasing importance in the transportation system of the country.

India has become a vital force in this modern air age, having acquired an important place in civil aviation among the nations of the world. As a meeting point of the air routes between the East and the West, India holds a key position in international aviation. With its vast distances and favourable climate throughout the year, India provides an ideal field for air transport.

India has four big airports at Bombay, Calcutta, Madras and Delhi, maintained at international standards, major aerodromes at Ahmedabad, Nagpur, Hyderabad, Bangalore, Gauhati, Tiruchirapalli and Delhi (Safdarjung), 45 intermediate aerodromes and 30 minor aerodromes. The Government of India proposes to construct in the immediate future new civil aerodromes in 14 places, namely, Ajmer, Aligarh, Berhampur, Calicut, Cuddalore, Dehra Dun, Hubli, Nellore, Ootacamund, Salem, Ratnagiri, Saugor and Surat.

There are three types of air routes in India: (*a*) trans-continental trunk routes, (*b*) regional trunk routes, and (*c*) local service routes. A typical trans-continental route is one which connects Bombay with Calcutta and is linked up with foreign and overseas air routes at Bombay, Delhi and Calcutta. The regional trunk routes connect foreign and overseas routes at Bangalore, Delhi, Hyderabad, Nagpur etc. The local service routes feed regional and trans-continental routes, such as the Trivandrum-Madras line or Dibrugarh-Calcutta line or Delhi-Srinagar line.

The four centres of Bombay, Calcutta, Delhi and Madras are the focal points of Indian air transport, to each of which are connected other centres by local services. The selection of a centre for linking with the focus is made not only on the basis of the availability of landing grounds but also on its commercial importance and possibilities of traffic.

In addition to Scheduled Services, a considerable number of passengers and quality of freight are handled by non-scheduled services.

Inasmuch as the general economic conditions of the country influence the growth and development of civil aviation, further extension of air traffic in India will depend on the rate of economic progress. The two other factors affecting the expansion are the high cost of aviation petrol which is a vital

element in the cost of operation, and the present size of aerodromes, many of which do not permit the use of latest and fastest aircrafts.

The air transport is now run by two Corporations.—Air India International and Indian Airlines. The first one is for operating long-distance international services and the second one for undertaking operations inside the country and to neighbouring States.

There are air transport agreements with Afghanistan, Australia, Belgium, Ceylon, Czechoslovakia, Ethiopia, France, Hungary, Italy, Japan, Lebanon, Nepal, Netherlands, Philippines, Sweden, Switzerland, Thailand, Iran, Iraq, West Germany, U.A.R., U.S.A., U.K. and U.S.S.R. Air India International has thus wide connections with different parts of the world. The services now extend to Aden, Cairo, Rome, Geneva, Kabul, London, Paris, New York, Singapore, Hong Kong and Japan, as well as to Burma, Ceylon, Nepal and Pakistan.

INDIA'S OVERSEAS AIR ROUTE PATTERN

India—U.K. (To London *via* Cairo, Beirut, Rome, Paris, Geneva and New York).
India—East Africa (To Nairobi *via* Aden).
India—Japan (To Tokyo *via* Bangkok and Hong Kong).
India—Australia (To Sydney *via* Singapore and Djakarta).
India—U.S.S.R. (To Moscow *via* Tushkent).
India—U.S.A. (To New York *via* London).

Several foreign airlines have also air services in the Indian Union. The important foreign lines are the British Overseas Air Corporation. Trans-world Airlines, Japan Airlines, Pan American World Airways and Air France.

It may be mentioned here that the maintenance of all airports in India in respect of management, improvement and modernisation is the responsibility of the Central Government. In the case of four international airports—Calcutta, Delhi, Bombay and Madras, this responsibility is that of a public sector since April 1972. This enterprise is known as Air Ports authority of India which is to ensure that the four international ports are

modernised and maintained for the efficient operation of air traffic.

14. Foreign Trade of India[19]

In spite of India's having a large territorial size, a large population of about 530 millions, vast natural resources, a fairly well-organised industrial structure for production of various semi-manufactures and finished manufactures, six major sea-ports to cover the entire sea-coast and a government with participative and sympathetic attitude towards industry and commerce, her volume of foreign trade is still small compared to the countries of Europe, North America and Japan.

Generally, the volume of foreign trade of a country cannot truly reveal the state of its industrial development inasmuch as there may be large domestic supplies and domestic demand. The volume is of significance when there are large imports of indispensable commodities which must be paid for by exports. This is precisely the problem of India. There is little doubt that India must increase her volume of exports. Her success in this regard will depend on how effective she can make use of her production methods and her industrial and fiscal policies.

FOREIGN TRADE OF INDIA

(In crores of rupees)

	Imports	Exports	Balance of Trade
1950-51	650	601	−49
1955-56	774	609	−165
1960-61	1,122	642	−480
1966-67	2,048	1,152	−896
1967-68	1,974	1,198	−775
1969-70	1,568	1,413	−155

[19] The data and statistics are the Government of India publications: Economic Survey, 1971-72; Annual Statements of the Foreign Trade of India, Report of the Tariff Commission Review Committee, India; Publication Division 1971.

The principal imports are, in order of importance, transport equipment, electric machinery, mineral oil, raw cotton, iron and steel, chemical elements, other metals, wheat and rice.

The countries which are the chief suppliers are the U.S.A., U.K., West Germany, Japan, and U.S.S.R. These countries together account for more than 70 p.c. of India's imports.

SOURCES OF IMPORTS (By sea, air and land)

(In crores of rupees)

	1961-62	1963-64	1966-67	1967-68	1969-70
U.S.A.	226	450	770	772	460
U.K.	200	171	164	158	100
West Germany ...	123	90	161	143	84
Japan	59	66	108	107	67
U.S.S.R.	39	68	110	96	170
Iran	47	48	30	33	85
Australia ...	24	18	55	65	31
Italy	26	17	39	34	40

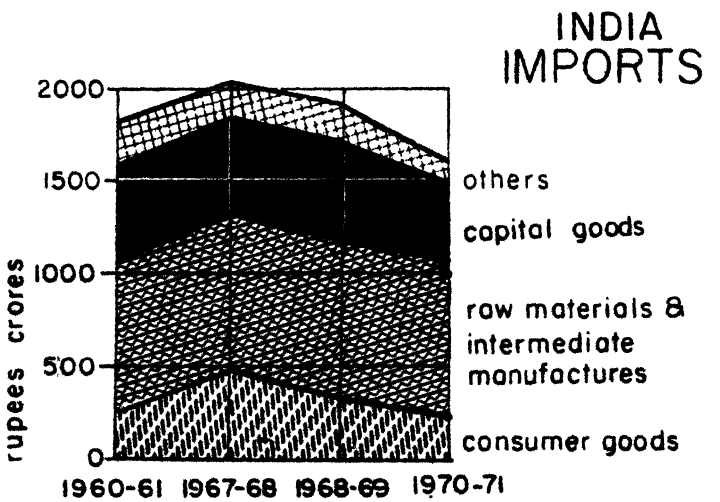


FIG. No. 104. India Imports.

The position of U.S.A. and U.K. have remained most significant with the difference that while the volume of U.S.A. import

is on the increase, that from U.K. is declining steadily. In fact, import from West Germany is almost equal now in terms of value to that of U.K. Another significant fact is the rapidly increasing trend in import from U.S.S.R. and Japan.

The composition of imports reveals that many imports are for agricultural and industrial development and some have decreased with self-sufficiency as in raw cotton, iron and steel and raw jute. In 1970, the value of imports of certain commodities was as follows in crores of rupees: electric machinery and appliances 63, wheat unmilled 184, rice 60, transport equipment 50, raw cotton 83, chemical elements 14, crude petroleum 96, copper 49, petroleum products 47, manufactures of metals 17, fresh fruits and nuts 34, paper and paper board 24 and aluminium 15.

The exports are, in order of importance, textiles, tea, leather, fresh fruits, iron ore, tobacco, hides and skins, raw cotton and crude minerals.

EXPORTS BY COMMODITIES: BY SEA, AIR AND LAND

(In crores of rupees)

	1962-63	1967-68	1969-70
Tea	129	180	124
Leather	22	53	81
Jute manufactures ...	115	284	205
Cotton manufactures ...	51	79	87
Iron Ore	20	76	95
Fruits and Nuts ...	21	45	60
Raw Cotton	12	15	18
Hides & Skins (undressed)	11	7	8
Coffee	8	18	20
Tobacco	17	35	33

The traditional items in the export are tea, jute manufactures and cotton manufactures which still account for more than 60 p.c. of India's total export. In recent years, a steady increase in non-traditional items like iron and steel, petroleum products, leather, sugar etc. has brought some diversification in the export trade. In 1971, India earned Rs. 160 crores from the export of tea.

The principal buyers are U.K. and U.S.A. followed by U.S.S.R. and Japan.

EXPORTS BY COUNTRIES

(In crores of rupees)

	1961-62	1967-68	1969-70
U.K.	160	229	164
U.S.A.	115	207	238
U.S.S.R.	32	122	176
Japan	40	136	179
Australia	16	28	24
Canada	18	30	26
Ceylon	17	15	25
West Germany ...	20	22	30
France	8	16	22
Malaysia	7	8	8
Czechoslovakia ...	8	29	30
Italy	9	18	13

In 1971, India registered a very high level of exports to the U.S.A. in spite of the strained political relations between the two countries. The value of exports to U.S.A. in 1971 was Rs. 246.9 crores. The main exports to the U.S.A. are ready-made garments spices, coffee, ferro-manganese and sugar preparations. Other exports are marine products, mica, footwear, coir yarn, manufactures, engineering goods, manganese ore and handicrafts. The entry of China in U.S. market has affected India's carpet export.

The most important instrument for forging economic ties with other countries and for increasing and diversifying the flow of trade in pattern and direction is the *trade agreements*. In 1968, India concluded new agreements and extended old ones with Afghanistan, Bulgaria, Cameroon, Czechoslovakia, France, East Germany, Greece, Hungary, Iran, Iraq, Jordan, Korea, Morocco, Philippines, Poland, Rumania, Sudan, Thailand, Tunisia, U.A.R. and U.S.S.R.

Some Broad Characteristics in India's Foreign Trade

(*i*) The balance of trade has remained unfavourable although several measures have been undertaken to bring some improvement. The adverse balance was particularly high during the Second Plan period when India launched on a programme of intense industrialisation, necessitating imports of machinery and equipment, and during the Third Plan period when poor production of food within the country because of droughts made importation of wheat and rice imperative.

(*ii*) During the recent years the exports have covered a number of diverse commodities like textiles, engineering goods, chemicals, plastics, handicrafts, marine producers, etc. However, traditional exports still play a major role in the expansion.

(*iii*) There is an element of diversification in the direction of export trade. The only continent with which the trade contacts are extremely limited is South America.

(*iv*) The volume index both in respect of exports and imports increased to 119 and 149 respectively over 1958 base in 1967.

(*v*) The measures for special assistance and incentives for exports are available in the case of goods suffering from disabling factors like high cost, scarcity of raw materials and greater demand in domestic market.[20]

(*vi*) Currently, in the composition of foreign trade, manufactured and semi-manufactured goods in export and raw materials and machinery in import occupy more prominent places.

15. Towns and Ports

Most of the cities in India have grown rapidly as a result of migration from the countryside. This migration has not been influenced by industrialisation. Rural population pressure and conditions in rural areas force many persons, particularly those who are young, to come to cities for their livelihood. The rate

[20] The Government has strengthened the institutional framework for export promotion. The Department of International Trade, the Board of Trade, Quality control and pre-shipment council are some of the institutions, set up in and after 1962. A number of fiscal measures have also been taken like reduction of the export duty on tea and increases in excise duties on several commodities in order to restrict internal consumption.

of urbanisation is now faster than the rate of industrialisation. Since most of the rural migrants are unskilled, they create a glut as soon as they arrive in the labour markets of the cities.

Although in the past, such migrants kept their contact with the villages—moving in and out of towns and countryside, the present tendency is to remain in towns because of general attractions of urban life.

SOME IMPORTANT TOWNS WITH POPULATION OF 100,000 AND OVER.

(Based on 1971 census)

(in '000)

Towns	Population	Towns	Population
Calcutta	7,040	Salem	308
Ahmedabad	1,746	Tiruchirapalli	306
Bombay	5,968	Bareilly	326
Poona	1,123	Kharagpur	162
Sholapur	398	Aligarh	254
Madras	2,470	Meerut	367
Madurai	548	Moradabad	268
Agra	637	Saharanpur	224
Patna	473	Shahjahanpur	144
Varanasi	583	Jullundur	296
Kanpur	1,273	Ludhiana	401
Lucknow	826	Gaya	180
Allahabad	502	Jamshedpur	356
Amritsar	433	Jabalpur	534
Nagpur	866	Ajmer	262
Delhi	3,629	Baroda	467
Bangalore	1,648	Bhavnagar	226
Hyderabad	1,746	Bikanir	189
Indore	573	Jaipur	613
Mysore	356	Gwalior	407
Surat	493	Trivandrum	410
Coimbatore	353	Cuttack	194
Hubli	367		

There were only 99 towns in India in 1971 with a population of 100,000 in each. U.P. has the largest number of towns, followed by West Bengal, Maharashtra, Tamil Nadu, Madhya Pradesh and Bihar.

Principal Ports

There are two classes of ports in India: major and minor. "The sheltered nature of a port, the well-laid-out approach channels, the provision of docks, jetties and moorings, the well-laid-out transit sheds, the effective rail connections, the ability to serve a very large portion of the hinterland lying behind the port, the facilities for meeting the requirements of defence and strategy, the comparatively large volume of traffic and the possibilities of work for shipping all the year round, usually distinguished a major port from a minor port." The major ports of India are Bombay, Mormugao, Cochin, Madras, Vishakapatnam, Calcutta and Kandla. Paradeep has been declared a major port in 1966.

The seven major ports of India handled 539 lakh tonnes in 1969. Of the total tonnage, imports accounted for 277 lakh tonnes, and exports 263 lakh tonnes.

Mangalore and Tuticorin are being developed as major ports. With their completion, the western coast will have six major ports as against four in the Eastern Coast.

India has over 150 minor ports of which the following are considered more important: Kakinada, Masulipatam, Cuddalore, Kozhikode, Mangalore, Tuticorin, Alleppey, Bhavnagar, Porbandar, Bedi Bandar, Broach, Ratnagiri, Okha, Quilon and Surat. The minor ports handle altogether about 9 million tons of traffic every year.

There are certain difficulties for the development of ports in India. Her coast-line has few indentations; the southern side is deficient in harbours to accommodate the large vessels now employed in sea-borne trade; the violence of the monsoon keeps the ports of the western coast of India, with the exception of Bombay, Kandla and Cochin, closed to traffic from May to August, and the eastern coast is surf-bound and requires constant dredging.

Not only has the traffic increased quantitatively but its pattern has also undergone considerable changes, involving new techniques of handling. There is need therefore not only of expansion of port facilities but also of a thorough overhauling of the existing facilities, equipment, gear, etc. The effectiveness

of the existing capacity of the ports can be increased considerably through modernisation and replacement of old and obsolete equipment. A very considerable portion of handling even in the bigger major ports in this country is still dependent on manual operation. The problem of modernisation of the ports in India is not therefore so much of installation of highly mechanised plants as of replacement of obsolete equipment and improvement of the general working condition.

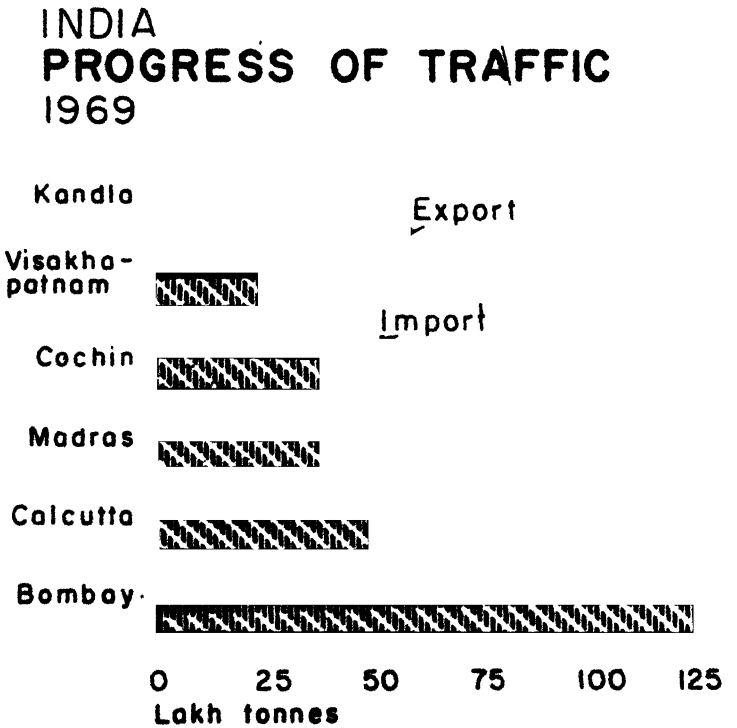


Fig. No. 105. India—Progress of Traffic.

The Principal Ports on the Western Coast of India

On the long coastline of Gujarat, there are about 50 ports. Only Kandla, Navlaki, Bedi, Sikka, Okha and Bhavnagar are open for traffic throughout the year, while remaining ports are closed during the four months of the monsoon.

Bedi Bandar is a small port which does considerable coastal trade. The sea is shallow and therefore, large steamers must anchor about 3 to 4 km away from the shore. *Okha* occupies a very good position at the extreme north-east point of the Kathiawar Peninsula. Although the sea in this port is deep enough for large vessels, the circuitous approach to the port makes navigation rather dangerous and the scanty population and small railway mileage of the hinterland stand in the way of its development. The port is open at all seasons of the year and competes sometimes with Bombay by offering lower port charges. The imports are textile machinery, motor cars, sugar and chemicals. The exports are oil-seeds and cotton. The port authorities recently launched a campaign for attracting industrialists and businessmen of the area to import their requirements through the Bhavnagar port with a view to encouraging the development of ports in that area and reducing import charges. The difference in distance between Ahmedabad-Bombay and Ahmedabad-Bhavnagar is such that there will be a good economy in regard to railway charges if goods are imported through Bhavnagar. Some of the other advantages to importers are : firstly, free days allowed in Bombay are five days whereas in Bhavnagar the importers are allowed fifteen days, and secondly, the delay owing to congestion at Bombay is obviated at Bhavnagar.

Kandla. The georaphical position of the port is best suited in its services to the hinterland covering Gujarat, Rajasthan, Punjab, Kashmir and Western U.P. As between Kandla and Bombay, Delhi is 950 km from Kandla as against 1250 km from Bombay. Similarly Hisser is 970 km. from Kandla as against 800 km from Bombay. Moreover, potentialities for development of industries and mineral resources in the territory of Cutch are vast, in particular those of fish, cement, glass, gypsum, lignite and bauxite. In 1952, a metre gauge railway line was opened which now connects Kandla with the mainland. This line extends for 240 km and meets the main railway line at Dessa. A broad gauge rail link to Ahmedabad via Jhund is under construction. The construction of a national highway connecting Kandla with Ahmedabad is also in progress.

Work on the construction of the new major port of Kandla was taken up in 1949. Cutch is an arid area, and the annual

rainfall is little over 12 inches. There is however a substantial reservoir of underground water around Kandla—enough for the port and the town. There is also a surface water reservoir with a storage capacity of 448 million cubic feet which can be utilised in years of satisfactory rainfall. Among the facilities that are available at the Kandla port are (*a*) four deep-water cargo berths, (*b*) four ware-houses (*c*) five mooring berths in the stream, (*d*) an oil berth to take large tankers, (*e*) a floating dry dock for small craft, and (*f*) a floating landing stage for passenger launches. The progress of traffic in Kandla since 1956-57 has been spectacular.

PROGRESS OF TRAFFIC IN KANDLA

(In lakh metric tons)

Year	Import	Export
1955-56	2	1
1957-58	6	2
1960-61 . . .	12	3
1965-66	23.4	1.7
1967-68	22	2
1968-69	17	3

The recent developments at Kandla include addition of berths, expansion of township and increase in water supply.

Bombay lies at the base of the Western Ghats. It has a natural harbour directly on the Sea. The hinterland of Bombay extends from the western part of Madras in the south to Delhi in the north, and includes Western U.P., Rajasthan, M.P., and the Maharashtra State. It is the first city from the point of view of population in the country and owes its importance to its magnificent harbour and its position as the nearest Indian port to Europe. Bombay is connected by railways with different parts of India. It is also a great industrial centre with its predominant position in cotton textile industry. Being the best natural harbour in India, the trade carried through Bombay is about 28 per cent of total trade in India. Large quantities of oilseeds, wool and woollen goods, hides and skins,

manganese ore and foodgrains are exported. The principal imports are manufactured cotton goods, machinery, railway plant, iron and steel goods, hardware, sugar, dyes, coal and petroleum. Limitations imposed by nature and the dock system stand in the way of the expansion of Bombay port.

PROGRESS OF TRAFFIC IN BOMBAY

(in lakh tonnes)

Year	Import	Export
1955-56	68	36
1960-61	108	40
1962-63	110	49
1965-66	129	51
1967-68	124	45
1968-69	121	43

Mormugao, between Bombay and Cochin, is a major port and important for exports. In 1968-69, its imports were 3 lakh tonnage compared to 54 lakh tonnage export.

Cochin, in Kerala, is the most important port between Bombay and Colombo. Its position is such that it can serve the whole of Southern India. Cochin became accessible to deep sea traffic only after 1929 when a channel 5 km long was constructed to remove the rockhard sand barriers which blocked the approach to the harbour for centuries. It is open for deep water traffic in the worst monsoons and provides a splendid anchorage at all times of the year. The system of back-waters which are running parallel with the coast affords cheap transport and excellent waterways connecting several places of importance in Kerala. Cochin port serves the vast hinterland of Kerala and the southern districts of the three States of Madras, Mysore and Andhra. The port is also connected by air with Madras and Bombay with daily services. The principal districts and the forest regions are also in contact by roads. The principal imports are food-grains, oil, metals, chemicals and hardware. Coir, yarn, coir mats and mattings, copra, cocoanut oil, tea and rubber are the chief exports from Cochin.

PROGRESS OF TRAFFIC AT COCHIN

(in lakh tonnes)

	Import	Export
1955-56	12	4
1960-61	16	4
1962-63	20	4
1965-66	24	4.6
1967-68	37	17
1968-69	38	14

THE PRINCIPAL PORTS ON THE EASTERN COAST OF INDIA

Tuticorin, as yet a port of the Tamil Nadu, is situated at the extreme south-eastern point of the Peninsula. The harbour is shallow, and constant dredging is necessary. Cotton, tea, senna leaves and cardamoms are the principal exports. The port has considerable trade with Ceylon. It handles 500,000 tons of cargo. The port will be in a position to have a traffic of one million tons a year when its deep-sea harbour is developed to convert it into an all-weather port.

Madras is the chief port of Tamil Nadu. Several railway lines connect it with Bombay, Tuticorin, Calicut and Calcutta. The port has considerable manufactures. Its extensive hinterland includes the whole of the Eastern Deccan, but then this area does not produce things which are required by the foreign markets in large quantities. Moreover, many small seaports on the Coromondal and Malabar Coasts compete with Madras. Before the construction of the harbour, Madras was an open roadstead with a surf-beaten coast. It is an entirely artificial harbour, enclosing about 200 acres by quay walls extending 3,000 feet.

Generally in the months of October and November, cyclonic storms occur in the Bay of Bengal which generate waves as high as 11 feet. The deep sea waves become translatory as they approach the shore and cause a bodily movement of water. Such waves, at the entrance of the harbour, develop a slow periodic surging of water mass in the harbour. This is called 'range'. Such undulations of the water level produce a fore and aft motion of ships. Ships are, therefore, often instructed to leave the port in such weather. In spite of such handicap,

Madras has increased the volume of her traffic enormously in recent years. 1114 ships entered the port with gross tonnage of 9 millions in 1969.

PROGRESS OF TRAFFIC

(in lakh tonnes)

			Import	Export
1955-56	...	...	19	6
1960-61	...	...	22	9
1962-63	...	...	26	12
1965-66	...	...	33	15.7
1967-68	...	...	37	21
1968-69	...	...	30	23

The chief imports are coal and coke, foodgrains, mineral oils, metals, timber, textiles, machinery and chemicals. The export are hides and skins, turmeric, tobacco and textiles. There are projects for additional ore and coal yards and mechanical equipment for handling iron ore at the port.

Visakhapatnam: It has become a major port within very recent years. It is a port of call for all ocean-going and coastal traffic steamers. It is situated on the Coromondal Coast, about midway between Madras and Calcutta—750 km south of Calcutta and 475 km north of Madras. Manganese, groundnuts, myrobalans, hides and skins are the chief exports. Cotton piece-goods, iron, timber and machinery are the important imports.

For shipping the produce of Orissa and the eastern part of Madhya Pradesh, Visakhapatnam offers better facilities than Calcutta from the point of view of transport charges. The harbour was developed in order to supply an outlet for a large area of fertile country adjacent to the east coast of India with considerable mineral resources and no alternative access to the outside world. The port is connected by the South-Eastern Railway with Bhilai and Raipur in Madhya Pradesh. The harbour at Visakhapatnam provides access for the vital crude oil supplies to the oil refinery. Thus the advantages of the port are the facilities of a fine harbour for handling cargo, rail access by South-Eastern Railway to provide distribution

inland, and development of major industries like ship-building and oil refinery. The number of ships that entered the port in 1969 was 626.

PROGRESS OF TRAFFIC AT VISAKHAPATNAM

(Lakh tonnes)

	Import	Export
1955-56 .	2	11
1960-61 .	13	15
1962-63 .	17	15
1965-66 .	18.9	25.7
1967-68 .	24	41
1968-69 .	27	54

There are plans to develop Vizag port in a big way. In case Japan increases her imports of Indian iron ore from 10 million tonnes to 18 million tonnes, there will be tremendous strain on the Vizag port, unless the handling capacity of the port is increased by 100 p.c. The Fourth Plan envisages such development of the port.

Calcutta, the second largest city in India, is situated on the left bank of the Hooghly, nearly 120 km from the Bay of Bengal. Although, primarily, it is a port for the Gangetic plain, it is also the greatest trading centre to the east of Suez. Its hinterland comprises Assam, West Bengal, Bihar, the Uttar Pradesh and parts of Punjab, Orissa and Madhya Pradesh, which are all connected with Calcutta by roads and railways. All these areas produce in large quantities goods which are wanted by foreign markets. The Ganga and the Brahmaputra by providing splendid natural waterways help to bring agricultural produce of the plains to be exchanged for the manufactured goods in Calcutta. Till recently, the trade of Calcutta depended to a large extent upon waterway communications. It was estimated that, before 1947, about 25 per cent of the merchandise reaching Calcutta from the rest of India came by waterways and approximately one-third of this from Assam. As regards trade from Calcutta, about one-third was carried by water and of this nearly three-quarters went to Assam. Of

late, however, the importance of waterways as a feeder of traffic to Calcutta has declined.

The port of Calcutta, which extends for about 8 km along the banks of the Hooghly, suffers from the disadvantage of the river being silted up. The frequent formation of a tidal bore in the Hooghly is another difficulty. The two important measures that have been undertaken to maintain and preserve Calcutta as a port are (*i*) the construction of an ancillary port at Haldia, 80 km down-stream of Calcutta for handling bulk cargo such as coal, iron ore, and food grains and also for lightering of general cargo vessels, and (*ii*) the construction of a barrage on the river Ganga at Farakka to improve the head-water supply in the Hooghly. "Owing to lack of sufficient head-water supply to flush the silt, there has been a steady and progressive deterioration in the regime of the Hooghly. Apart from its adverse effects on the navigability of the river, the gradual choking of the channel has led, on the one hand, to an increase in the frequency of the bore tides in the Hooghly, and, on the other, to a steady rise in the salinity of its waters." The construction of the barrage is not only to provide a lasting solution but also to improve communications between North and South Bengal and reduce the length of inland water transport route between Assam and West Bengal.[21] The provision of greater facilities for incoming and outgoing ships is

[21] There is no deep-water harbour in Calcutta and vessels of more than 9,000 tons have to dock at Diamond Harbour, 40 miles down from Kidderpore. To increase the port facilities there was a proposal to connect the port of Calcutta with Diamond Harbour by a ship canal. This idea of a ship canal is not new, and, as a matter of fact, this proposal was examined seriously in 1945.

Apart from the question of heavy expenditure on the scheme, the main difficulty will be that many villages between Diamond Harbour and Kidderpore will have to be destroyed in the process of execution of the scheme entailing not only hardship on thousands of villagers but also loss of rice-fields.

Another problem is the Hooghly itself. If the canal is constructed, the Hooghly will not receive proper attention. It must not be forgotten that "the Hooghly provides the only outfall channel for the rivers of West Bengal and its abandonment will only aggravate the flood menace during the rains, but that the whole area would, as a consequence, get water-logged and unproductive." The Nadia rivers are also linked up with the Hooghly, both upstream and downstream of Calcutta. Therefore, the Hooghly should be revitalised by the infusion of fresh water from the Ganga, so that upstream and downstream navigability of the Hooghly may improve.

being provided. Calcutta handles about 25 per cent of India's sea-borne trade.

Calcutta with its suburbs is the greatest manufacturing area in India. Its jute mills, paper mills, cotton mills, sugar factories, engineering works, etc., use the coal of Raniganj and Jharia. Calcutta is the greatest jute centre of the world. Other industries of importance are rice mills, cotton mills, tanneries, perfumeries, iron and steel works and match-making. The principal exports are jute, tea, mica, coal, iron, manganese and shellac. The principal imports are iron and steel goods, sugar, petroleum, motor cars, paper, chemicals, liquor, salt, rubber and machinery.

Since 1960-61, the volume of traffic at Calcutta has remained almost stagnant. Although the port occupies the second position in respect of volume of traffic after Bombay, the difference in volume of tonnage between two ports is very great.

PROGRESS OF TRAFFIC AT CALCUTTA

(In lakh tonnes)

Year	Import	Export
1960-61	56	40
1962-63	55	47
1965-66	52.8	45.7
1967-68	49	41
1968-69	40	40

Trade Centres

Trade centres have grown in six different classes of cities in India. These are: (*i*) holy cities, (*ii*) ancient capitals, (*iii*) ports, (*iv*) health resorts, (*v*) manufacturing cities, and (*vi*) modern administrative capitals.

India is a land of *holy cities*. Varanasi, Puri, Allahabad, Mathura, Madurai, Gaya and many other cities attract pilgrims as holy centres and have now become important trade centres. Some of the *ancient capitals* of India like Nagpur, Poona, Murshidabad, Delhi, Agra, etc., are important as centres of trade. *Health resorts* are mostly confined to the sea-sides and

the hills where people in large numbers go for a change from the plains. *Ports and manufacturing centres* in India command the largest trade because of railway and navigation failities. The examples of new manufacturing cities are Durgapur, Bhilai, Rourkela, Jamshedpur, Bangalore, and Kotah (Rajasthan). The major sea ports of India are all centres of industries. Administrative reasons have also led to the development of many cities in districts and divisions of India: Chandigarh in Punjab, Gorakhpur, Lucknow, Mirzapur, Moradabad, Aligarh, Agra.

Uttar Pradesh has an area of 294,364 sq. km. and a population of about 88 millions. It has made fairly good progress in agriculture, manufactures and road development. The important trade centres are Allahabad, Varanasi, Kanpur, Gorakhpure, Lucknow, Mirzapur, Moradabad, Aligarh, Agra, Dehra Dun, Jhansi, Mathura, Saharanpur and Bareilly.

Allahabad is the principal railway centre, and is situated at the confluence of the Ganga and the Jamuna. There are several oil mills, glass factories and flour mills in the city. The trade is considerable, because the city enjoys unique advantages in regard to communication by rail, roads and rivers. *Varanasi*, on the bank of Ganga, is one of the biggest towns of India. The city besides being a place of pilgrimage for the Hindus is also an important industrial and commercial centre. Toys of wood, zarda, lac bangles, ivory articles, silk cloth, blanket sheets, linseed, mustard seed, sugar and gram are the chief articles of trade. There are several oil mills and silk factories. The place is also noted for brass-work. *Kanpur* is a great collecting and distributing centre for Northern India. It is also an important railway junction of the Northern and North-Eastern Railway. It has the largest manufacturing industries in the U.P. Cotton pressing and ginning are the foremost. Sugar mills, flour mills, iron foundries, chemical works, cotton mills and oil mills are the important industries. *Gorakhpur* is situated on the left bank of the river Rapti. The chief industry is carpentry. Timber is brought here from the Nepal border. The city has a large number of sugar factories. *Lucknow* is an important distributing centre for the rich agricultural produce of Oudh. The city is growing in importance rapidly. There are several railways and iron foundries. The articles of trade are silver and gold

works, ivory and wood carving, pottery and perfumes. *Mirzapur* is situated on the fertile tract of land on the bank of the Ganga. Carpets, rugs and silk cloths are the chief manufactures. Its stone business is also famous. *Moradabad* is noted for brass-ware. *Agra,* on the Jumna, is an important centre of arts and manufactures. The articles of trade are carpets, shoes, brass utensils, looking-glass frames and marbles. It is an important railway junction. It is also a collecting and distributing centre of Rajputana. *Aligarh* is famous for its manufacture of locks and other brassware. Bangles, glassware and butter are other articles of importance.

Punjab and Haryana have a population of a little above 23 millions—Punjab 13 million and Haryana 10 million. The availability of electric power from the Bhakra-Nangal units in addition to what the States were already receiving from the Uhl River units, has enabled the two states to make remarkable progress in industry.

The principal industries are cotton textiles (Amritsar, Ludhiana, Hissar), woollen textiles (Dhariwal, Panipat, Amritsar, Ludhiana), silk textiles (Ludhiana, Amritsar), paper (Jagadhri), sugar (Phagwara, Jagadhri, Rohtak), sports goods (Jullundur, Patiala), glass (Ambala), chemicals (Amritsar), cycles (Sonepat), cement, etc. The production of light engineering goods in small and medium-sized units is a recent feature, and the two States have already established reputation throughout the country for their products. The important trade centres are Amritsar, Ludhiana, Jullundur and Simla. *Amritsar* is famous for its carpets and shawls. The other important industries are the manufacture of textiles, acids, chemicals, hosiery and leather. *Ludhiana* and *Jullundur* are noted for light engineering products and hosiery.

Madhya Pradesh has an area of 443,452 sq. km. with 41 millions of people. The important industries are cotton textiles (Indore, Gwalior, Rajnandgaon, Ujjain, Dewas), potteries (Jabalpur), paper (Nepa mills at Chandi), cement (Banmore, Kymore), rayon (Gwalior), heavy electricals (Bhopal), iron and steel (Bhilai), straw board (Ratlam), etc. The important trade centres are Indore, Gwalior, Bhopal, Ujjain, Jabalpur, Dewas and Katni. *Jabalpur* is noted for cement, glass, lime and

potteries. It has a gun-carriage factory. Its other industries are cotton textiles, brass and copper utensils, etc. *Katni* is an important centre for utensils, stones and grains.

West Bengal is a densely populated State. It has an area of 87,617 sq. km. and it contains a population of a little more than 44 millions. West Bengal is highly industrialised and the chief industries are iron and steel (Burnpur and Durgapur), jute (Hooghly basin with about 95 mills), cotton mills (Howrah, Srirampur, Calcutta), paper (Titaghar. Ranigunj, Naihati), chemicales (Calcutta), etc. About 1 million industrial workers are employed in the different industries of the State. The village industries of West Bengal provide employment to a large number of people. Silk and cotton goods are the important products of the village industries. West Bengal raises about 25 p.c. of the country's total coal production and 20 p.c. of tea.

The important trade centres are Calcutta, Howrah, Bhatpara, Asansol, Bally, Kharagpur and Burdwan. *Srirampur* and *Salkea* situated near Calcutta, possess a number of cotton mills. *Batanagar*, on the Hooghly, is a new industrial place, famous for shoe-making.

Mahrashtra has an area of 307,477 sq. km. with 50 million population. The coastal region of Maharashtra has become a great industrial region of India. There are 97 cotton mills, 20 sugar factories, a number of engineering works, chemical factories automobile industry, paper mills etc. The important industrial and trade centres are Bombay, Poona, Nagpur, Sholapur, Amaravati, Akola and Nasik.

Gujarat has an area of 187,115 sq. km. with 26.6 million population. The major industries are cotton and woollen textiles, electrical engineering, chemicals and cement.

The State has one major port (Kandla), six medium ports (Okha, Bedi Bandar, Bhavnagar, Verawal, Sikka and porbandar), and about fifty minor ports. Gandhinagar, 15 miles from Ahmedabad city, is the new capital.

The industrial centres are Baroda, Surat, Ahmedabad, Bhavnagar, Jamnagar and Rajkot.

Tamil Nadu has an area of 130,253 sq. km. with 41 million population. The State has become a great industrial area

within recent years. The main industries are textiles, sugar, chemicals, cement, glass, tanneries and matches. The village industries whose products have demand in and outside the country give employment to more than 2 million people. The important trade centres are Madras, Madurai, Tiruchirapalli, Salem, Coimbatore, Tanjore and Tuticorin. *Madurai* has several weaving mills. Copper and brass vessels are also made here. In *Tiruchirapalli* there are many cigar factories. Coimbatore is the centre of cotton textile industry.

Delhi is the greatest historical city in India. Like other old capitals in India it has old court industries of gold and silver, filigree work, muslin, wood and ivory carving and shawl-weaving. It is an important clearing house for Punjab and the western districts of the U.P. in cotton, silk and woollen piece-goods. It has several modern industries like chemicals, cotton spinning and weaving mills. Ivory carving, Jewellery works, lack work and gold embroidery are the other important activities.

Delhi is magnificently served by roads, railways and airways. Since the national highways pass through Delhi, the road transport from Delhi to the Punjab, Rajasthan, U.P. and Madhya Pradesh is of vital importance. It has direct railway services with Bombay, Ahmedabad, Madras and Calcutta. It has two airports—one for inland services and the other mostly for trans-continental services. Since the river Jumna remains unnavigable for nine months in the year, the river traffic is of no importance. The growth of new industrial cities around Delhi like Gaziabad, Shardra, Faridabad, Sonepat and Ballavgarh has added to the commercial activities of the city.

Assam is the most easterly state of India. It has 15 million population. The main trade centres of the State are Shillong and Gauhati. With the creation of Meghalaya, Arunachal Pradesh and Mizoram, out of the present state of Assam, a few minor trade centres are to become more important. *Shillong*, is in the Khasi Hills on an altitude of 4,000 ft. above sea-level. Fruits and hill-products are the articles of trade. *Gauhati*, on the left bank of the Brahmaputra, is the largest town and the most important port of Assam. It has a population of more than 100,000. Gauhati is a commercial centre and handles, as a port and a railway centre, silk, tea and timber.

Orissa has an area of 155,825 sq. km. with a population of more than 22 millions. Large-scale industries are being developed, such as steel plant at Rourkela, aluminium at Hirakud and paper mills at Chandwar. The principal trade centres are Cuttack, Puri, Berhampore and Balasore. *Cuttack,* the chief town of Orissa, has a population of more than 146,000. The local manufactures comprise lac bangles, toys and combs. It is connected by the Orissa Coast Canal with Chandbali. *Puri,* a holy place of the Hindus, is an open roadstead. As the sea is shallow, the steamer can anchor only about 7 miles away from the shore. The total manufactures consist of brass, silver and golden ornaments. *Bhuwaneswar* is the capital of the State and is developing fast as a health resort and trade centre of importance.

Rajasthan has an area of 342,274 sq. km. and a population of about 26 millions. The industries are concerned with the production of cloth, sugar, salt, cement, ivory goods, stone work, etc. The trade centres are Jaipur, Jodhpur, Udaipur, Bikanir, Alwar, Ajmere and Kotah. Jaipur is the capital of Rajasthan. It is famous for its artistic pottery and brass-wares. Jodhpur has a railway workshop and woollen and cotton mills. Stoneworks are also important.

Mysore with an area of 192,204 sq. km. and 29 million population is noted for coffee plantations, sandal wood, rose wood and gold. It has vast potentialities for industrial development. Sandal wood oil distillery is the biggest of its kind in the world and enjoys virtual monopoly in production. Other industries are iron and steel at Bhadravati, cement at Sahabad, aircraft manufacture and telephone manufactures at Bangalore, porcelain at Mysore, machine tools, etc. The trade centres are Bangalore, Mysore, Bellary, Hubli, Belgaum and Dharwar. Bangalore is 230 km. west of Madras. Carpets, cotton textiles, woollen goods, machine tools, aircraft manufactures, and telephone are the principal industries. In fact, Bangalore is the centre of industrial activities in Mysore. Soap, shellac, furniture and porcelain are also made.

Jammu and Kashmir has a little over 4.6 million population. Over 85 per cent of the people depend on agriculture. The chief agricultural products are rice, wheat, oilseed and

saffron. The fruits like walnuts, almonds, pears and apples are extensively raised. Most of India's walnuts are grown in Kashmir and exported through Bombay. About 5,000 tons of walnuts are exported annually, a good deal of which is sent to U.K. Because of the aggression by Pakistan, the export of walnut from Kashmir declined after August 1965, and the only country to benefit from the decline has been China which has stepped into this *walnut gap* and doubled its shipments of walnuts to U.K. market. Woollen and silk manufactures of Kashmir are well-known for their quality and design. The trade centres are Srinagar, Jammu and Udhampur. Srinagar, the capital of Kashmir, is famous for silk, embroideries and carved woodwork. Although Kashmir has no railway communication, excellent motor roads connect the different places with Srinagar and Jammu. Because of the natural scenic beauty, thousands of tourists visit Kashmir every year. Tourism thus provides one of the largest sources of revenue to the state.

Kerala with 38,855 sq. km. is the smallest State in India. It has about 21 million population, and the average density of population is 435 per km. The State has made good progress in manufacturing industries like ceramic, rubber, rayon, chemicals, glass, aluminium, plywood, etc. Most of the modern large scale industries of Kerala are either Government owned or sponsored. The trade centres are Trivandurm, Cochin, Quilon, Alleppy, Ernakulam and Trichur. *Trivandrum* is an important industrial, commercial and educational centre. It is noted for coir fabrics, pencils, ivory works, cement and nuts.

QUESTIONS

1. "The so-called famine regions of India are not necessarily the regions of low rainfall, but rather get moderate rainfall with little or no provision for irrigation works." Explain.
2. Divide India into major climatic regions, and describe the chief characteristics of the climate of each region. (Delhi B.Com. 1969).
3. Examine the factors which have influenced the distribution of population in India. Indicate the modern trends in the variation of population. (Cal. B. Com. 1961 ; Indian Institute of Bankers 1960 ; Delhi B. Com. 1969 ; 1971).
4. Analyse the present position of agriculture in India and suggest ways and means which, in your opinion, will help its future development. (Delhi B. Com. 1964).
5. What are the two principal plantation crops of India ? Discuss which of these are important in India's foreign trade. Describe the

conditions favourable for their growth and mention the regions of their production in the country.
(Cal. B. Com., 1958 ; Rajasthan B. Com., 1969).

6. What are the geographical and climatic conditions necessary for the successful cultivation of jute and cocoanut ? Where are they produced in India and how far is their supply sufficient for their requirements of export ? (Indian Institute of Bankers, 1960).

7. Describe the geographical conditions under which rice and wheat are cultivated in different parts of India. What are the measures adopted that have resulted in improvement of their production in India ?
(Rajasthan B. Com. 1962 ; Delhi B. Com. 1965).

8. Give an account of the geographical factors involved in the distribution and production of tea. (Delhi B. Com. 1965).

9. Describe the geographical factors involved in large scale irrigation projects of India. Give two examples from some recent projects. What are the effects of excessive irrigation ?

10. What do you understand by the term *multipurpose river valley project* ? Examine the geographical setting and economic significance of any one of the major river valley projects in India.
(Cal. B. Com. 1949 ; Rajasthan B. Com. 1962 ; Delhi B. Com. 1964).

11. Is India rich in forest products ? How are these utilised at present ? Discuss the prospects of increasing exports of Indian timber to the world's markets.
(Delhi B. A. Hons. 1950 ; Delhi B. Com. 1955 ; Raj. M. Com. 1956 ; Delhi B. Com. 1964).

12. Show the relationship between the distribution of rainfall and the distribution of the different types of forests in India. What are the principal commercial products from these forests ?

13. Give an account of the mineral resources in India and the extent to which they are utilised.
(Agra B. Com. 1952 ; Rajasthan M. Com. 1956).

14. Give an account of the distribution of iron ore and coal in India and examine their importance in the industrial development of the country. (Delhi B. Com. 1964 ; 1971).

15. Make a critical assessment of the mineral resources of India. Which of these are mostly raised for foreign markets ? Does India need any policy of conservation for minerals ?
(Rajasthan B. Com. 1961 ; Delhi B. Com. 1968).

16. Analyse the geographical conditions suitable for the development of hydro-electric power. How far are these conditions in existence in India ? Give a brief review of the development of the power since 1950.
(Cal. B. Com. 1953 ; Raj. B. Com. 1960).

17. Describe the present position of the petroleum resources in India, and indicate the extent to which the resources have been exploited.
(Rajasthan B. Com. 1962 ; I. I. B. 1968).

18. Mention the sites where new factories are being set up for the manufacture of iron and steel, and account for their location.

19. State briefly the present condition of the Indian paper industry. Name the indigenous raw materials used for manufacturing paper and mention where they are found. (Agra B. Com. 1961 ; Cal. B. Com. 1959 ; Delhi B. Com. 1964 ; 1971).

20. Give an account of the iron and steel industry of India with special reference to (a) sources of raw materials and (b) geographical reasons for the location of the industry. What are the expansion schemes in this industry under Five Year Plan ?
(Cal. B. Com. 1961; Delhi B. Com. 1965, 1969; Agra 1953; Rajputana B. Com. 1955; Indian Institute of Bankers 1962);

21. Account for the location of the jute industry on the banks of the Hooghly basin. Discuss the position of the industry in regard to raw jute supply. (Cal. B. Com. 1960).

22. Give a geo-economic description of the cotton textile industry in India with reference to raw materials and location of the industry. Explain why the industry is so widely dispersed though the cotton cultivation is mainly confined to the Deccan. (Delhi B. Com. 1965 ; 1969).

23. Explain briefly the various factors which are responsible for the location and development of the following industries :

(*a*) Cotton industry in Ahmedabad.

(*b*) Woollen industry in Kanpur.

(Indian Institute of Bankers, 1960).

24. Give an account of the cement industry in India with reference to (a) sources of raw materials, (b) locations and (c) markets.

(Delhi B. Com. 1964, 1969 ; Rajasthan B. Com. 1961 ; Indian Institute of Bankers 1964).

25. Discuss the place of inland water transport in India bringing out clearly the place it occupies in the economy.

(Delhi B. Com. 1965 ; Delhi B. Com. 1971).

26. Compare the relative advantages of railway transport, water transport and motor transport in India. Why and on what ground is nationalisation of motor transport advocated in India ?

(Indian Institute of Bankers, 1964).

27. To what extent are conditions in India favourable for the development of air-transport ?

(Indian Institute of Bankers 1962 ; Delhi B. Com. 1960).

28. What are the characteristic features of the foreign trade of India ? What changes have taken place in the items of our exports and imports in recent times ? (Cal. B. Com. 1960 ; Agra B. Com. 1951 ; Delhi B. Com. 1964 ; 1969 and 1971)

29. Describe the nature of the present-day trade between India and U.S.A. How far do you think this trade admits of development ?

(Delhi B. Com. 1952 ; I. I. B. 1968).

30. Write short notes on the following:

(i) Damodar Valley Project, (ii) Bhakra-Nangal Project, (iii) Tea Plantation in Assam, (iv) Population distribution in Peninsular India, (v) Forest resources of India. (Delhi B. Com. 1968 and 1969).

31. Discuss the importance of the following: (a) Agra, (b) Calcutta, (c) Ludhiana, (d) Kanpur, (e) Digboi, (f) Ahmedabad, and (g) Kandla.

(Indian Institute of Bankers, 1962 ; 1968).

32. Analyse the geographical conditions that have contributed to the location and development of Calcutta as a port. What are the navigational difficulties facing this port, and what do you suggest for their remedies ?

(Cal. B. Com. 1961).

33. Discuss the important factors in the origin and development of sea ports. Give examples from India. (Delhi B. Com. 1968).

34. Make a comparative study of the hinterlands of Calcutta and Madras ports. (Delhi B. Com. 1968).

PART IV

NEIGHBOURS OF INDIA

CHAPTER XVII

PAKISTAN[1]

Pakistan covers an area of 310,226 square miles with 49 million population.

Pakistan which stretches from latitude 24° to 27°N borders Iran, Afghanistan, India and the Arabian Sea. Pakistan is divided into 10 divisions, each of which has been subdivided into a number of districts.

[1]Pakistan which was created in August 1947 out of the undivided India because of the desire of the majority of Muslims consisted of two wings till March 1971—West Pakistan and East Pakistan. West Pakistan included Beluchistan, North-West Frontier Province, West Panjab, Sind and a few states which acceded to Pakistan. East Bengal and Sylhet constituted East Pakistan.

Since the inception of Pakistan, its "rulers managed to extract resources worth $=3000 million from East Pakistan and used this to develop West Pakistan alone". In 1970, the facts of disparity were as follows:

	East Pakistan	*West Pakistan*
Population ...	75 million	55 million
Per Capita Income ..	$ 60	$ 105
Foreign Exchange earned .	60%	40%
Budgetary expenses . .	33%	67%
Civil Service	20%	80%
Foreign aid allocation .. .	20%	80%
Army	9%	81%

The population of East Pakistan was extremely anxious to remove the disparity and gain fundamental rights as equal partners in Pakistan. They demanded democratic, constitutional rule by the elected representatives of the people of Pakistan. The Awami League, headed by Sheikh Mujib of East Pakistan won the absolute majority in the first general election in Pakistan in December 1970. The military administration of Pakistan did not allow for the transfer of power to the elected representatives, and started severe repressive measures. Sheikh Mujib gave a call for struggle of independence on 23rd March 1971. What followed thereafter was something that never happened in human history in terms of indignities and destruction of human lives and property. Millions of people were uprooted; three millions were killed; and widespread arson and plunder started. Ultimately on 6th December 1971 a war broke out between Bangladesh and the Pakistan army. Bangladesh sought the help of India which was given. The war was over within two weeks as the Pakistan army surrendered unconditionally. Pakistan with two wings is dead. Bangladesh is now an independent Republic.

From a geographical aspect Pakistan may be divided into four regions.

(1) Dry Plateau
(2) North-Western Dry Hill Regions
(3) Arid Plains
(4) Deserts

(1) The whole of Kalat division in the south-west of Pakistan is a dry plateau and lies outside the influence of the monsoon and geographically belongs to the Iranian plateau. The climate is subject to extreme heat and cold with rainfall uncertain and scanty. Due to lack of water, only a small fraction of the country is under cultivation by means of "Karez" irrigation or by flood waters from the rivers. The principal crops are millets, wheat and fodder. Fruits are extensively grown. Grapes, apricots, peaches, apples, pears and melons are exported. Mulberry cultivation is also practised.

(2) The Peshawar division and the adjoining areas of the Western Pakistan belong to the Dry Hill Regions. The whole region is a mass of mountains pierced by several passes which function as trade routes to neighbouring countries. The rainfall nowhere exceeds 20 inches. The rivers are the keys to the geography of the region. The roads follow the valleys of the rivers. Irrigation has been developed in the valley of Peshawar and the Bannu plain where the population is the thickest. The region is outside the influence of the monsoon and most of the scanty rain falls in the cold season. The important crops are wheat, gram and millets. The region is noted for the production of fruits like grapes, melons, pears, figs, peaches and pomegranates.

(3) The plain encompasses the valleys of the Indus and its tributaries and covers the whole north-eastern and south-western and the southern portions of West Pakistan. The plan is drained by the five rivers Jhelum, Chenub, Sutlej, Ravi and Beas—all of which join the Indus. Thus rivers are perennial and give rise to floods in the monsoon season. The north-eastern plain is damper and grows crops without irrigation. The western plain is very dry and all crops are dependent on irrigation.

The southern portion is a dry alluvial plain stretching from the edge of the Baluchistan plateau to the Thar desert on the east. Agriculture is developed with irrigation along the Indus Basin.

(4) The desert covers the south of the Sutlej and the eastern portion of Hyderabad division. The region is, really speaking, the Western part of the *Thar* desert. The rainfall is less than 5″ a year.

Irrigation: The importance of irrigation in Pakistan can hardly be exaggerated. The rainfall is not only uncertain but also varies from year to year. The rainfall is under 10 inches in the whole of Kalat and Hyderabad divisions, while it is between 10 and 20 inches in West Multan division and the north-western part of Rawalpindi. Only the extreme eastern part of West Punjab receives more than 20 inches rainfall. Pakistan, therefore, depends to a great extent, for cultivation on the irrigation works. About 34 per cent of the cultivated area of Pakistan is irrigated compared to 17 per cent in the Indian Union.

Much of the irrigation in Pakistan is by canals which get water from the Indus and its tributaries. While irrigation has greatly helped the development of agriculture, one serious problem has also been created along with it in Pakistan. 20,000 to 40,000 acres of land are going out of cultivation every year because of water-logging caused by seepage from the beds of unlined canals. Water-logging is accompanied by an accumulation of deleterious salts which makes cultivation impossible.

The canals of the Punjab are of importance for two main purposes: one is to have water for irrigation and the other for carrying water from one river to another to serve as a feeder or link so that deficiencies in one river can be made good from the surplus of the other.

The eastern part of Pakistan including the districts of Multan, Montgomery, Lyallpur, Lahore and Shahpur constitutes a canal colony, where the conditions are excellent for developing irrigation.

The Principal canals: (*a*) The largest irrigation work is the Lower Chenub Canal which was first constructed in 1890.

It has 2,437 miles of channels and irrigates more than 2 million acres of land of the Lyallpur colony. It takes its water from the Chenub at Khamki and has turned a semi-desert tract into a rich agricultural area around Lyallpur, where population has increased with great rapidity after the opening of the canal system.

(*b*) The lower Jhelum Canal has 583 miles of channels and irrigates more than 8,60,000 acres of land of the Chaj Doab (lands between the Jhelum and the Chenub). The head-stream is at Rasul on the border of Kashmir State. In winter months the Jhelum is almost dry below Rasul.

(*c*) The Upper Jhelum Canal takes its water from the Jhelum at Mangla in Kashmir and irrigates Gujarat lying between the Upper Jhelum and the Upper Chenub. The canal was opened in 1915.

(*d*) The Upper Chenub Canal takes its water from the Chenub at Marala in Kashmir and joins the Lower Bari Doab Canal at Balloki on the Ravi. The canal was opened in 1912. The canal serves Sialkot, Gujranwalla and Sheikhpura.

(*e*) The Upper Bari Doab Canal which has its headwater at Madhopur and passes through Amritsar district in the Indian Union, also irrigates Lahore and Montgomery districts.

In Bahawalpur there are three canals, namely, the Bahawal Canal, the Fordwan Canal and Sadiquia Canal—all taking off from the Sutlej.

The Indus is the only source of water to the canals of Sind. Since the up-stream tributaries are utilised for irrigation canals before they join the main river, the flow of water in the Indus is naturally affected. A great dam has been constructed across the Indus river by putting a barrage at Sukkur in order to control the waters of the rivers; from the dam, water is distributed by means of seven large canals to different areas of Sind. The two largest canals are the Eastern Nara (226 miles) and the Rohri (208 miles). The Sukkur Barrage has transformed Hyderabad Division from a desert into a granary of Asia and irrigates about 5.5 million acres of land. The Upper Hyderabad area which is not served by the Barrage System has three canal works—(*a*) the Desert Canal, (*b*) the Begari Canal and (*c*) the Unhar Wah Canal. The Lower Sind area has two canals—(*a*) Karachi Canal and (*b*) Fuleli Canal. In 1958, another canal

was constructed to take off water from the Ghulam Muhammad barrage across the Indus which irrigates 2.3 million acres of land in the Lower Sind area. In the northern part of Sind, a barrage is being constructed on the Indus at Gudu, 80 miles above Sukkur to ensure adequate supplies of water to inundation canals and to convert them into perennial canals. Thus, the three barrages will serve the Northern, Central and Southern regions of Sind for agriculture.

In Peshawar division about 400,000 acres of land are now being irrigated by canals which take off from the Swat and the Kabul. There are four major canals: the lower Swat, the major Swat, the Kabul river canal and the Paharpur canal. The upper Swat system was opened in 1914 and now serves about 70 per cent of the irrigated area of the province.

Because of the importance of the development of water resources for irrigation, flood regulation and drainage as a way of increasing the agricultural yield and expanding the cultivable area, the Government has undertaken many schemes. The important projects are the Thal Project, the Rosul Project and the Warsak Project. The Thal Project is to draw water from the Indus to irrigate the three districts of Shahpur, Mianwali and Muzzaffargarh which are located between the Indus and the Thal desert. The Rosul Tubewell Project envisages the construction of 1,800 tube-wells to provide sub-soil water and to reclaim water-logged areas by pumping sub-soil water back to canals.

The Warsak Multipurpose Project of the Peshawar division will develop 100,000 kw. of energy and provide facilities for irrigation to 60,000 acres of land in the Peshawar district and several thousand acres in the Tribal areas, including a portion of the Bhajuri plan, outside Jamrud. The project will enable the Kohat Valley to construct tube-wells for irrigation. The Warsak will supply power for working the Mullagori marble mines, four miles from Warsak dam, coal deposits in the Cheral hills near Peshawar and in the Kohat district, gypsum in Kohat, copper ore in the Mohmad country and subsidiary industries. It will also provide canal navigation.

Wells are being introduced for irrigation in Pakistan. Small power-pumps are used in well-irrigation, particularly in the districts of Lyallpur, Jhang, Sheikhpura and Sargodha,

"Karez" is an underground system of irrigation which is extensively practised in Baluchistan plateau.

Agriculture

Agriculture is the most important industry in Pakistan, as more than nine-tenths of the population depend on it for their living. Agriculturally, five zones can be distinguished in Pakistan: (*a*) *Sub-montane*—the Peshawar division, (*b*) *North-eastern plains* of canal colonies, Gujarat and Sialkot, (*c*) *North-West*—Rawalpindi, Jhelum, Attock, Mianwali, Peshawar, Kohat and Bannu, (*d*) *South-Western plains*—Gujranwala, Lahore, Lyallpur, Montgomery, Multan, Bahawalpur, Dera Ghazi Khan and Dera Ismail Khan, (*e*) Hyderabad.

The principal crops are wheat, rice, maize, sugar-cane, cotton, oil-seeds and tobacco. However, it is only on two crops —wheat and cotton—that the principal economic activity depends. These crops provide employment to most of the labour force, furnish the two basic elements of the national diet, sustain banking system and account for a major part of the foreign exchange earnings. It is no exaggeration to say that the prosperity of Pakistan is linked with the production and trade of these two commodities.

Wheat : It occupies about 14 million acres of land and gives a yield of about 5 million tons a year. It is mostly grown in the districts of Canal Colonies, Peshawar and Hyderabad.

The West Punjab alone accounts for more than 77 p.c. of total production of wheat in the country.

Wheat is cultivated in Pakistan in the months of November and December and is harvested in May. The average yield of wheat per acre in the Canal Colonies is 700 pounds and in Sind area 600 pounds. Salination, soil erosion and a rise in the sub-soil water level have prevented large tracts of irrigated areas from growing wheat crops. The water supply in canals is not adequate and "knowledge of commercial fertilisers and improved farming methods are not generally spread among small cultivators who continue farming according to ancient methods."

A little quantity of *barley* is also grown in Pakistan, most of which comes from Canal Colonies and Peshawar division.

Barley occupies about 572,000 acres of land. The barley production is about 161,000 tons. The other food crops of Pakistan are *Maize, Pulses* and *Gram*. Maize is extensively grown in Pakistan.

Gram covers approximately 3 million acres, of which 98 per cent are in areas drained by the Jhelum, Ravi and Sutlej. Small quantities are also raised in Hyderabad and Peshawar divisions. Although gram is cultivated in many districts, the largest acreage under this crop is found in Shahpur, Montgomery and Multan.

The position of Pakistan in the matter of foodgrains is normally satisfactory. There is a surplus of wheat and rice in Pakistan in almost every year. With improved agricultural methods, extended irrigation, more capital and better communications, Pakistan would be able to support a population larger than at present.

The sugar-cane tracts are Montgomery, Lyallpur, Sialkot, Peshawar and Lahore districts.

Cotton: It is the most important industrial crop of the Indus valley, although produced in every part of the Republic. Pakistan contributes, about 6 p.c. of the world crop and ranks third as a world exporter.

Pakistan raises about 97 per cent of the country's cotton. Multan, Montgomery. Lyallpur, Shahpur, Lahore, Sheikhpura and Jhang districts account for 90 per cent of the cotton production. In each of these districts cotton occupies 20 to 30 per cent of the sown area.

In about 3.2 million acres of land, Pakistan raises about 2.8 million bales of 478 lbs each a year.

The Lower Indus valley has cotton tracts in the districts of Tharparkar, Hyderabad and Nawabshah where about 900,000 acres of land are under cotton.

Two types of cotton are cultivated in Pakistan—Desi and American upland type. American upland type cotton has been raised in the eastern part of Indus valley, which is watered by a perennial canal system and where the climate has plentiful moisture. Such plants need about 7 months of growing season during which time there must be no risk of frost. At present

the American varieties account for 90 per cent of the total production and about 75 per cent of the acreage. Pakistan exports about 40 per cent of her raw cotton mainly to Japan, Hong Kong, West Germany, United Kingdom. Of the total production of raw cotton in the country, more than 60 per cent is consumed by the cotton mills and the rest is exported outside. The extent of demand for raw cotton by the Pakistan cotton mills industry can be judged from the fact that, in 1950, the mill consumption accounted for only 9 per cent of the raw cotton production as compared to 70 per cent in 1964. Because of the internal demand the export of raw cotton has declined considerably.

Broadly speaking, the forests of Pakistan can be classified into three groups : (1) Coniferous forests extending over Hazara, Malakand, Rawalpindi, Dhir, Chitral and Swat. The trees are spruce, fir etc. (2) Submontane forests in the northern districts of the former West Punjab and Baluchistan with trees like *kao, pine and phulai.* (3) Riverine forests of the Indus basin with *babul* and *sisham.*

The principal trees which yield timber in Pakistan are the following : —

(*i*) Babul in Sind valley, Baluchistan Plateau and the central region of Pakistan.

(*ii*) Blue pine in North-Western Region and North-Eastern Region of Pakistan.

Mineral Products

The present position of Pakistan in respect of industrial minerals is not very satisfactory, although she is endowed with diversified mineral wealth. Several areas are under examination, and it may be possible to *get iron deposits* in the North-Western part of Pakistan, *manganese* in Chitral, Kohat and Baluchistan, *copper* in Baluchistan, Chitral and Waziristan, *mica* in Hazara district and Baluchistan plateau and *bauxite* in Baluchistan. Substantial *deposits of coal of good quality are* lying below 250 feet in Baluchistan plateau.

The country is in a somewhat anomalous position in that most minerals of industrial importance are located in Baluchistan, Chitral and the western fringe of Pakistan, but no minerals are mined in areas where the greater number of manufacturing industries are located and denser population exists. The industrial and commercial exploitation of most of the minerals of Pakistan will depend on the development of cheap and rapid transport.

The important minerals of Pakistan are Chromite, Petroleum, Salt, Saltpetre, Gypsum, Limestone, Clay, Fuller's Earth and Antimony.

Chromite : In Baluchistan plateau, chromite has been mined since 1901. In the past 30 years, a total of 60,000 tons of chromite has been mined and exported. The Hindubagh area of Baluchistan is said to have the second largest chromite deposits in the world. Pakistan raised about 37,000 tons of chromite in 1967.

At present, almost the entire production of chromite is exported. There is little demand inside the country.

Deposits of chromite are found in Kharan, east of Raskoh and in Chagai district west of Raskoh in Baluchistan plateau. Some deposits are also available in Chitral and extreme north-western part of Pakistan.

Manganese : Four small deposits of manganese have recently been located in Lasbela and Kalat. The manganese oxide contents are between 40 and 50 per cent, and the total quantity available has been estimated at 500,000 tons. Copper ores are extensive in the Raskoh range in Baluchistan. At present copper is not mined in any part of Pakistan, though further prospecting is expected to be undertaken soon.

Iron ore : The most significant iron ore deposits are those in Chitral. Other areas are Attock and Sargodha district, and Mardan in the north-east of Peshawar. The iron ore deposits have 40 to 60 per cent iron contents. The commercial workable reserves of these deposits are not yet known. Several small veins of magnetite have been found in the northern side of Raskoh in Baluchistan plateau. At present iron ore is being worked in Kalabagh.

Minerals	Annual Production	Areas of Production
Gypsum	The production is about 192,000 tons. The reserves are estimated at over 30 million tons. The use of gypsum as a raw material for the production of fertilizers in Pakistan is now under active consideration of the Government.	Jhelum, Shahpur and Mianwali in Pakistan, Baluchistan plateau, Sind valley and Kohat. Large deposits of Gypsum have also been found in Dera Ismail Khan.
Fuller's Earth	This clay is non-plastic in nature and is used as filler in soap and paper and in paints.	Canal Colonies, Kohat, Malakand and Sind valley.
Salt	West Punjab salt mines produce about 60 lakh maunds of salt, while the Kohat mines yield between 7 and 8 lakh maunds. The production of sea salt is about 41 lakh maunds.	The important field for rock salt is in Kohat. Common salt is manufactured at Mauripur in Sind valley.
Limestone	The production of limestone is 1.9 million tons.	Attock, Jhelum and Rawalpindi.
Clay	Large quantity. Production is about 16,000 tons.	Fire clay in Dera Ismail Khan district. Ochre and other coloured clays in Chitral.
Antimony	Large reserves--but not developed yet.	Chitral and Kalat. The inaccessibility of the neighbourhood its elevation of 13,500 ft. and its climate, which is rigorous enough to limit work to 2 or 3 months in the year, have hindered any active exploitation up to the present time in Chitral.
Alluvial Gold	Small quantity.	Jhelum district in Pakistan. At present gold is obtained by gold-washers from surface gravels only. Attempts are being made to work deeper gravels for gold.
Granite	20,000 tons.	Kohat, Abbotabad.

Coal : Both in quality and quantity Pakistan is today poor in *coal.* The principal coalfields are in Sharigh and Harnai on the Sind-Pishin railway and in the Bolan Pass, also in Sor Range in the Quetta-Pishin district. Pakistan coal, however, is "high in volatile matter, often very low in ash and remarkably rich in organic and pyritic sulphur". The Pakistan coal is mainly used in cement kilns and brick burning. There are possibilities of using this coal after mixing with imported steam coals for the generation of electric power, railways, cotton mills, glass factories and rice plants. It is estimated that Pakistan contains 366,000 million tons of coal reserves.

In the north-western region of Pakistan, there are three possible coal areas : (*a*) The Dore river of the Hazara district, (*b*) Kohat district just north of the Baroch gorge, and (*c*) Mira Kwand in the Spli Toi in South Waziristan. In Baluchistan plateau, the Khosh area is an important coal-field.

The country imports coal in increasing quantities from South Africa, China, Britain, France and Poland. South Africa alone can meet Pakistan's coal requirements for industrial and domestic purposes, although this coal is slightly inferior to Indian coal and unsuitable for locomotives. As South Africa has her own mercantile marine, this coal can be cheaper than Indian coal so far as Pakistan is concerned.

To bridge the gap between internal production and consumption of coal, the Pakistan Government has spent a considerable amount of money to increase the output of coal mines in Pakistan. The production of coal in 1969 was 1.4 million tons.

Petroleum : Among all the mineral resources of Pakistan, *petroleum* is the most important. The total production of crude oil in Pakistan in 1969 was 500,000 tons.

Although geological formations give evidence of oil in several regions of Pakistan, only one is as yet a significant producer. This region is composed of two fields—Khaur and Dhulian at Attock.

These two fields were developed by the Attock Oil Company in 1915 and 1937 respectively. The fields are located about 20 miles south of the outer foot of the hills of the Himalayas.

Production in these two areas has been around 20 to 36 million gallons a year in recent years. The refinery is at Rawalpindi at a distance of 56 and 67 miles from Khaur and Dhulian respectively. Oil from these fields is brought in a pipe-line to the refinery at Rawalpindi. Joya Mair, a new oilfield, about 40 miles south of Rawalpindi, has also started production. This field holds out promise of greatly increased oil output in Pakistan.

Pakistan petroleum industry engages about 3,500 workers. Development work is being carried out in Sind valley, where the drilling has now exceeded a depth of 9,000 feet.

Pakistan can at present meet only 20 per cent of her requirements of petroleum from domestic production. There are many possible areas of oil production. The Kohat Salt region, North Waziristan, Dera Ismail Khan and Bannu district may yield in future considerable oil. But, at the same time, it is to be noted that in many parts of the Punjab and the Baluchistan area the rock-fields have been too deeply truncated by agents of denudation or have been dislocated by earth movements and many of the original stores of oil have disappeared; oil seepages are common enough, but most of them appear to be mere "shows not connected with reservoirs that can be tapped by artificial means."

Natural Gas: A vast reservoir of natural gas was discovered at Sui in Baluchistan in 1953, which can revolutionise the industrial economic development of Pakistan. Apart from thermal power, the Sui gas will form the basis of a variety of chemicals useful in the production of plastics, rayons, resins, silicons, refrigerants and carbon black, used in the printing industry. Four wells have now been sunk, and the supply can be 100 million cubic feet of gas per day (which is equivalent to 1.6 million tons of coal for thermal power) for 60 years at a stretch. The reserves are estimated to be over 2,250,000 million cubic feet. There is a pipe-line of 350 miles from Sui Range to Karachi to transmit 50 million cubic feet of gas per day for agriculture and industry. A second pipe-line from Sui to Multan supplies gas to industry.

Water-power: There is considerable scope for the development of hydro-electric power in Pakistan. It has been esti-

mated that Pakistan's hydro-electric potential is to the extent of 6 million kw. The present installed capacity is only for 63,000 kw. Already three hydro-electric projects are being worked out. These are (*a*) the Rasul hydro-electric scheme (West Punjab), (*b*) the expansion of the Malakand Station in the former N.W.F.P., and (*c*) the Dargai Station near Malakand. *The Malakand Hydro-electric plant* which was the main station in the country till 1948, supplies power to cement works at Wah and electricity to 88 towns and villages in Mardan, Peshawar, Kohat and Hazara. The plant is located at Jabbon on the Malakand Pass and utilises the Swat river for generating power.

The Rasul Hydro-electric scheme is by far the most important project of Pakistan. It utilizes the head available from the Upper Jhelum canal into the Lower Jhelum canal. The project has installed capacity of 22,000 kw. of firm electric power and about 20,000 kw. of secondary power for several towns (in West Punjab) as well as for lift irrigation.

The Warsak dam, when completed, will generate 160,000 kw. to industrialisation for benefit of the whole of N.W.F.P. of Pakistan. The marble quarries of Mullegori, the coal mines in the Sharat Hills and the gypsum and copper mines of Mohmand territory will obtain power from the Warsak plant.

The other projects under construction in Pakistan are (*a*) the Chichki-Mallian hydro-electric project, (*b*) the Kurran Garhi multi-purpose project (N.W.F.P.).

Pakistan has greatly developed the fruit industry in Rawalpindi, Jhelum and Attock districts. The Murree Hills may be considered as the fruit garden of the region. Oranges, mangoes, lemons and sweet limes are the principal fruits in the central region of Pakistan. There is a plan to grow, on commercial lines, apples, walnuts, almonds and olives in the Murree Hills.

The north-western region of Pakistan grows pears, peaches, figs, plums, bananas and mangoes. Figs, peaches and pears are in great demand both in the country and in the Indian Union. *Baluchistan* plateau depends for its economy on fruit trade. Grapes, apples, apricot and musk melons are grown extensively for markets in Pakistan and the Indian Union.

Lower Indus valley has a large production of grapes and dates. Dates are also grown in Bahawalpur.

In spite of the large production of fruits in Pakistan, the *fruit canning industry* is yet to be developed on modern lines. There are certain difficulties in the way of developing the fruit canning industry in Pakistan. Peaches and other fruits are often affected by fruit-fly. Uneven ripening of peaches is another problem as it affects the uniformity of the canned product. Other difficulties are the inadequate supplies of tin and bottles, the high cost of sugar and the lack of stable market. Peshawar is now the only centre of the fruit canning industry in Pakistan. Pakistan, however, promises to be a very important source of fruits in the near future for world markets.

Livestock Population

Livestock plays a very significant role in the agricultural economy of Pakistan as it is the only source of power for various agricultural operations. The relief and climate of Pakistan are generally suitable for livestock population. "Certain breeds of cattle have achieved world reputation for draught purposes."

There are about 20 million cattle and buffaloes, 7 million sheep, 6 million goats, 1 million horses and half a million camels.

The climate of south-western part of Pakistan does not produce good pasture, so that in those areas cattle are not so important as in the eastern part of Pakistan. In Pakistan, camels are mostly found in Sind Valley and Baluchistan Plateau. Hyderabad and Peshawar Divisions support a large number of sheep. Buffaloes are mostly found in the Lahore Division. "There is an important horse population, used mainly for transport, and the Punjab is particularly reputed for its breeding farms which have in the past concentrated on breeding horses for the army and also for racing."

The principal products are meat, milk, hides, skins and wool. The annual requirements of meat are in excess of the domestic production. Efforts are being made to increase the output of meat by 1.4 per cent each year for maintaining the present consumption of calories coming from livestock products. The *dairy industry* has developed in the districts of Montgomery,

Lyallpur and Multan. The *leather industry* is of growing importance. As raw materials are plentiful, the tanning industry has great prospects in Pakistan.. *The annual production of raw wool in Pakistan is about* 20 *million lbs.* Practically all wool is good only for making carpets. Superior grades of wool are also available but these are in small quantities. The best wool comes from Sind Valley and Baluchistan Plateau. Wool became a particularly valuable economic asset to Pakistan after the country's independence in 1947. It ranks third in importance among her exportable commodities. From country's seven million sheep about 28,000,000 lbs. of wool is produced annually. Pakistan also imports wool from Afghanistan, Iran and places on the Persian Gulf. The chief buyers of raw wool are the U.K. and the U.S.A. Pakistan is not likely to develop an export trade in meat although her leather export is important.

Fisheries

In Pakistan, the industry is concentrated along 550 miles of coast. The entire sea-coast of Pakistan is important for the fishing industry. The production of sea-fish off the Baluchistan coast is about 93,000 maunds a year.

Lower Sind has a coastline of about 200 miles studded with creeks. The Indus brings silt and other materials in the delta which provide food for fish. For about 80 miles from the coast, the depth of the sea is nowhere more than 100 fathoms. Thus the Sind coast has become an important fishing ground.

The catches are prawn, salmon, mullet, pomfret, mackerel and hilsa. Sind is a great exporter of fish. The Sind Government is carrying on systematic work in preparing and analysing the oils obtained from liver and body of fishes, such as skates, rays and other varieties which were hitherto not utilized. As a result of the utilization of these fishes, it will be possible to manufacture glue and gelatine. The Baluchistan coast is about 350 miles long. There are bays and backwaters but no discharge from rivers. Fishing is carried on within miles of the coast. Fishing is practised from September to May, because in June, July and August, the sea is rough.

One of the handicaps of Pakistan fishing industry is the lack of powered fishing boats and modern gear. The fish har-

bour at Karachi is being developed for mooring boats, establishing wholesale fish market and cold storage and ice plants. The Makran Coast in Pakistan is also being provided with facilities for cold storage and ice plants.

A fish harbour has been constructed at Karachi and is now operating. As a result of steps being taken by Government to develop fish industry, the production of fish, and its export to foreign countries is increasing. Fish harbour at Karachi alone is handling about 100 tons of fish daily valued at about Rs. 80,000. The dry salted fish is imported by Burma, Ceylon and Malaya from Pakistan.

Manufactures

The availability of many kinds of raw materials, and the desire to diversify its economy so as to be less vulnerable to the instability of foreign demand for its primary exports and less dependent on foreign supplies of manufactured products, led Pakistan to launch its vigorous programmes of industrialisation in Pakistan.

Cotton Mills: In Pakistan the cotton mills are Lyallpur, Lahore, Okara and Karachi. The general trend of production is that about 10 p.c. is of the fine varieties, about 60 p.c. of the medium and the rest of coarse variety. The country has become self-sufficient in the coarse and medium varieties of cotton cloth. Import of cotton piecegoods, cotton twist and yarn declined sharply after 1953 with rapid increase in domestic production.

The need for imported cotton textiles will, however, continue so long as the superior and cheaper varieties are not produced in the country. The future of cotton industry is full of promise, as Pakistan is a great producer of raw cotton and consumer cloth.

The strength of Pakistan's cotton textile industry lies in the fact that 60 per cent of her total looms are automatic compared to 82 per cent in the case of India.

It may be mentioned in this connection that the production of fine and superfine varieties of cotton goods is still inadequate in Pakistan. Pakistan imports superior cotton textiles mostly

from the United Kingdom, though low-grade Japanese textiles are also in great demand for their low prices.

Sugar Industry: Sugar factories are distributed as follows:—

Region	Centres
Pakistan	Rawalpindi, Abbotabad, Mardan, Jauharabad and Charsadda.

The main problem, is the scattered nature of sugar-cane areas which necessitates quick transport to mill areas. A sugar factory at *Mardan* in the Peshawar division of Pakistan, the biggest of its kind in Asia, has started operation from 1950. The factory has a total daily capacity of 1,500 tons. It is a great step towards making Pakistan self-sufficient in sugar.

The Woollen Industry: For centuries the production of wool has been one of the principal occupations of millions of people in Pakistan, and even today the livelihood of many tribes in Baluchistan and the North-West Frontier Province depends almost entirely on this industry. Tweeds, rugs, carpets and blankets are being manufactured in Pakistan. There is a factory at Karachi for the manufacture of yarn and worsted yarn. Pakistan's blanket industry consumes about half the raw wool production of the country. The Pakistan Government has recently started two woollen mills with 2,000-spindle capacity each, at Hannai in Baluchistan region and Bannu in North-Western region of Pakistan.

Match, Cement and Glass Factories: The match Factories are located at Lahore. Of the three factories in Lahore, two are owned by the Western Indian Match Company. The Lahore factories employ about 500 workers recruited locally from Lahore and its surrounding villages.

The cement industry is well-organised. The Pakistan Industrial Development Corporation has set up two more cement factories with annual capacities of 100,000 tons and 240,000 tons respectively. These factories will raise the capacity of the cement industry to one million tons per year. At present the cement factories are at Wah (in the Attock District) and Karachi. The

factory at Wah belongs to the Associated Cement Companies and employs about 1,500 workers recruited mostly from the adjoining villages. The Associated Companies also own the cement factory at Rohri in the Sukkur district of Sind Valley.

The **glass industry** is of recent growth. There are three factories in Pakistan.

Facilities of Transportation

Pakistan has means of expanding transportation by land, air and water. Since the country is an agricultural one and has large surpluses of products for export, transport systems will always play a vital part in Pakistan's economy.

Railways: The railway system in Pakistan was originally designed primarily for strategic purposes and also for the transport of agricultural produce from the irrigation areas of N.W.F.P., Punjab and Sind to Bombay, Delhi and Karachi.

The Pakistan Western Railway has its headquarters at Lahore. It has 5,344 miles of line with 4,500 miles of broad gauge. There are two main lines with several branches:

(*a*) Lahore to Peshawar *via* Wazirabad, Rawalpindi and Attock. The distance of the line is 238 miles. From Wazirabad a line goes to Sialkot on the border of Kashmir.

(*b*) Lahore to Karachi *via* Khanewal, Lodhram, Rohri and Sukkur. The length of the route is about 800 miles. The line crosses the Indus at Rohri. From Sukkur a branch line goes to Zahidan *via* Sibi and to Chaman *via* Quetta.

There are also other branch lines which connect Wazirabad with Khanewal; Peshawar with Muzaffarpur; Rohri with Bandin. The P. W. Rly. has 747 stations.

Road Transport in the modern sense of the term is highly developed in Pakistan, where there are metalled roads con-

sisting of main and trunks. The total mileage of roads in Pakistan is 60,000 of which 26,000 miles are of superior type. Superior surface roads are mostly confined to former West Punjab and N.W.F.P.

The roads are the responsibility of the provinces but the Central Government's policy is to stimulate road development by financial allocations from the Central Road Fund, by development loans and by grants.

Some important roads in Pakistan :

(*a*) Grand Trunk road from Landikotal near Khyber Pass to Wagah on the Indo-Pakistan border through Peshawar, Rawalpindi and Lahore.

(*b*) Trunk roads from Karachi to Lahore and Lahore to Quetta.

(*c*) Inter-provincial roads from Peshawar (N.W.F.P.) to Bostan (Baluchistan), from Karachi to Quetta and from Dera Ismail Khan to Shikarpur.

Frontier roads: There are five main land-routes which connect Pakistan with Iran, Afghanistan and Sinkiang :

(*a*) From Chaman (in Baluchistan) along the Khojak Pass to Kandahar and Herat.

(*b*) From Quetta to Zahidan on the Iran-Baluchistan border by a branch line of the P.W. Railway; thence by caravan route to Iran. Of late, regular motorable roads have been opened connecting Zahidan with Teheran *via* Bam, Kerman, Yezd, Ardistan and Kasan.

(*c*) From Peshawar along the Khyber Pass (2,370 ft.) to Kabul and Jalalabad. The distance between Peshawar and Kabul is about 170 miles. The Khyber Pass is only 30 miles long. The route has followed the Kabul river. From Peshawar to Landikhana—a distance of 55 miles—the road lies far to the south of the river.

(*d*) From Attock to Kashgar (Sinkiang) *via* Chitral and Hindukush. There is also a 350-mile caravan route from Peshawar to Gilgit in the high Karakoram over Babusar Pass (13,700 feet). From Gilgit a branch route goes south-east 100 miles up

the Indus to Skardu, the capital of Baltistan. Gilgit is the centre of an age-old caravan traffic from Sinkiang. From Kashgar the traders bring silk, cotton cloth, carpet, sheep skin and goats to exchange for kerosene, sugar, matches and salt. The Peshawar-Gilgit route has been widened recently by the Pakistan Government so that motor lorries can traverse the whole distance within 4 days.

(*e*) From Dera Ismail Khan along the Gomal Pass (7,500 ft.) to Kalat and Kandahar. The Gomal Pass as a trade route is the oldest of all trade routes in the Indo-Pakistan subcontinent. From the plains of Afghanistan every year thousands of traders with caravans enter the sub-continent down the Gomal. The traders bring camel-loads of silk and fruits, bales of camel and goat hair, sheepskins and carpets from Kabul and Bokhara.

Inland Water Transport: The rivers of Pakistan are little used for transport. Though the Indus is one of the greatest waterways of the world, it has ceased to carry traffic since the railway traversed its valley and prevented inland water transport from becoming a competitor. Also the irrigation projects draw heavily on the waters of the Indus.

The *Indus* rises on the north side of Kailash range, near the source of the Sutlej. In its upper and middle course, the Indus receives the water of the *Shyok, Kabul, Kuram* and *Gomal.* But the most important tributaries are the *Jhelum, Ravi, Chenub* and *Sutlej*—all flowing from the western Himalayas and joining the Indus at Mithunkot. These four great tributaries, with the Indus itself, give their name to the Punjab—that is, the "Five Waters".

The right-bank tributaries (*e.g.,* the Shyok, the Gilgit, the Kabul, and the Gomal) have no plain stage as they enter close to the mountains. The left bank tributaries, on the other hand, have a long course through the plains, and are therefore much more important both for navigation and irrigation.

The Indus is 1,800 miles long and is navigable for 1,000 miles from its mouth. The shifting character of its banks and sudden floods during the rainy season are responsible for the absence of important towns on its course. It is interesting to note that Multan, Lahore, Lyallpur, Wazirabad and Bahawalpur are situated not on the main stream but on its tributaries.

Civil Aviation

Pakistan is today supplied with airports and aerodromes in many parts of the country and is in a position to meet the expansion of aviation. The important aerodromes are at Karachi, Lahore, Quetta, Peshawar, Hyderabad, and Multan. They also operate service to Bombay, Calcutta and Delhi in the Indian Union as well as to Ceylon, Burma, Singapore, Teheran, Cairo, London and Kabul.

Karachi is the principal international airport in the country and forms a gateway between Europe and the Far East. Its position on the international trunk routes has made it very important.

In January 1955, the nationalisation of all air-lines took place, and the new concern is known as Pakistan International Airlines Corporation. It may be mentioned that several international airlines operate through Karachi. Some of the major airlines are British Overseas Airways Corporation, Pan American Airways, Air France, Indian Airlines Corporation and Royal Dutch Airlines.

Ports and Trade Centres

Pakistan has access to the Arabian Sea and the Bay of Bengal.

Karachi is the most important port of Pakistan. It is provided with a splendid natural harbour. Its hinterland is very extensive covering as it does not only the whole of West Pakistan but also Iran and Afghanistan. Karachi is situated in the triangular Bay of Karachi which is separated from the mainland to the rocky headland of Manora. The American civil war, the opening of the Suez Canal in 1867 and the establishment of a direct railway line to the Punjab in 1878 led to the development of Karachi as a great wheat and cotton export centre. For long, its expansion was held up because of the greater shipping facilities in Bombay and the industrial backwardness of the Karachi hinterland. The port of Karachi covers an area of 2½ square miles. The principal exports are wheat, oil seeds, cotton, wool, hides and bones. The imports are cotton manufactures, sugar, metals, machinery, oil, woollen manufactures, liquor, chemicals, etc. Karachi is more noted for commerce than for industries.

Karachi is connected with its hinterland by the Pakistan Western Railway.

A striking increase in the volume of tonnage handled by the port of Karachi has been recorded during the past sixteen years, ever since the birth of Pakistan. In 1948, Karachi handled a little above 2 million tons of cargo. In 1967, the volume of cargo was about 7 million tons. Though exports have declined during the period, imports have nevertheless risen and the gross turnover of tonnage has progressively increased.

Pasni, about 300 miles west of Karachi, is likely to become a port of importance in future inasmuch as it has a natural harbour and is connected by rail with Quetta and other places. Kedi Bandar, Shah Bandar and Sokhi Bandar are other minor ports of Pakistan.

Trade Centres

There is a large number of towns with population of more than 100,000 in each in Pakistan. The important towns are Lahore, Rawalpindi, Sialkot, Lyallpur, Multan, Karachi, Quetta, Jacobabad, and Hyderabad.

Lahore is the largest city and the chief trading centre of Pakistan. It stands on the river Ravi and is 33 miles distant from Amritsar. Cotton weaving, tanneries, glassworks, flour mills, sugar mills, etc. are the chief industries. Leather trade is important. According to the latest census the population is about one million.

Lyallpur, 87 miles south-west of Lahore, is the biggest wheat-exporting centre of Pakistan.

Multan is a frontier town. It is an important collecting centre. It brings fruits, drugs, silk and spices from Afghanistan and passes them on to the East. It is connected by railways with Lahore and Karachi.

Abbotabad, with a population of 40,000 is a hill station on the border of Kashmir. Leather and stone works are carried on in the city on an extensive scale. Recently certain weaving and spinning mills have been established. *Peshawar* is an important military and trading centre.

Foreign Trade

The loss of East Bengal as a market will be appreciated from the fact that West Pakistan sold goods worth Rs. 139 crores and Rs. 167 crores in 1968-69 and 1969-70 respectively. Of the total goods sold to East Bengal in 1969-70, manufactured goods accounted for Rs. 75 crores.

During the same period, East Bengal sold to West Pakistan goods worth Rs. 87 crores and Rs. 92 crores respectively. Thus the trade had always been in favour of West Pakistan.

In many agricultural commodities, Pakistan occupies an important place as an exporter. She is the largest exporter of raw wool in Asia and she is also the second largest exporter of raw cotton and hemp in Asia.

The principal items of export are raw cotton, raw wool, woollen manufactures, gypsum, potassium nitrate, raw hides and skins. Some foodgrains, and vegetables are also exported. About two-thirds of the cotton production are exported. The intense competition in the foreign market does not hold out much prospects of raw cotton export. The other important items are raw wool and hides and skins.

The chief items of imports are textile yarn and manufactures, mineral oils, machinery, steel and manufactures thereof, motor cars, chemicals, food, paper, electrical goods, etc. Her imports from India include cotton cloth and yarn, jute manufactures, sugar, gur, iron and steel, paper and coal. The volume of trade with India both in respect of imports and exports has considerably decreased within recent years.

U.K., Japan, China and Italy are the sellers of yarns to Pakistan. U.K., Japan, U.S.A., Italy, Iran, China and Ceylon are the main countries with which Pakistan has trade relations.

U.S.A., furnishes over 30 per cent of Pakistan's *overseas* imports and takes nearly 25 per cent of her exports. Japan is the major supplier of cotton goods to Pakistan. The imports from U.K. are machinery, metals and ores, textiles, instruments and apparatus, etc. The principal exports to U.K. are raw cotton, wool, and hides and skins.

The diversification of its foreign trade has been the predominant feature of Pakistan's foreign trade policy. This was motivated by the desire to diversify the economy.

Problems of Pakistan: Because of the emergence o Bangladesh as an independent sovereign state, Pakistan is nov deprived of most of its natural resources like raw jute, tea tobacco, and timber. It has also lost a market of 75 millior people for its cotton and textile mills. The nucleus of an eco nomic come back is seen in the fact that West Pakistan retain most of the technicians, business men and professional expert from the pre-war nation. Also, West Pakistan has fertil land, a good irrigation system and an abundant supply o natural gas. Shortage of raw materials and foreign exchange unemployment and political unrest are the present problems.

QUESTION

1. On a sketch map of Pakistan show the regions where irrigatior has much developed.

CHAPTER XVIII

BANGLADESH

General Considerations

Bangladesh is the youngest independent sovereign Repub-
, formd on 23rd March 1971 as the result of the determi-
tion of the people of East Pakistan to sever all connections
th Pakistan and to establish secularism, democracy and so-
ılism in the country as Bangladesh. The new state received
: recognition of India and other countries of the world from
:cember 1971 onward. It has an area of 55,126 square miles
d a population of 70 millions. It terms of population, it
the eighth largest country in the world being headed by
ıina, India, U.S.S.R., U.S.A., Indonesia, Japan and Brazil.
nong the States with largest muslim population, Bangladesh
cupies second place after Indonesia. It is situated between
titudes 20° 45′ and 25° 30′ N with frontiers along India on
ree sides. It has a border with Burma for 170 miles and
e Bay of Bengal for about 450 miles.

The geographical situation of Bangladesh is ideal for
ade and commerce. It has not only communication with
ıdia by railways and rivers, but its ports—Chittagong and
halna—can foster overseas trade with different countries of the
orld. The Bay of Bengal is indented by a series of channels
nd bays, and with planned programmes, the country can deve-
)p a few more ports. Few countries in the world have such a
ıagnificent river ways which remain navigable throughout the
ear as in Bangladesh.

The average density of population is 792 per square mile.
Tipperah district is the most populated region with 1500 per-
ons per square mile.

The divisions and the districts in Bangladesh are as
ollows:

Dacca Division	Dacca, Mymensingh, Faridpur and Bakarganj.
Chittagong Division	Chittagong, Tipperah, Noakhali, Chittagong Hill Tracts and Sylhet.
Rajshahi Division	Rajshahi, Dinajpur, Rangpur, Bogra, Pabna, Kushtia, Jessore, and Khulna.

Natural Regions

Bangladesh can be divided into two natural regions: (i Wet lowlands or New Delta region, and (ii) Ganga-Brahma putra Doab. Bangladesh is a new deltaic region formed b the Brahmaputra and the Ganga with their distributaries Every year huge quantities of silt are brought down by th rivers. During the monsoon period, a great part of the regio is flooded, and a rich deposit of silt is spread over the countr The rivers thread their way across the region and eventuall flow towards the Bay of Bengal. In their lower reaches, th Brahmaputra and the Ganga are called the Jumna and Padm respectively. The rainfall is more than 75 inches everywhere and the soil is very fertile. The climate of Bangladesh is sub-tropical with a high humidity. The northern part of th country is really a portion of the Ganga-Brahmaputra Doab. The surface is usually flat with broken hills here and there. The east and north-east of Bangladesh consist of hills and mountains of which the Lushai Hills in the east stretch as far as Chittangong.

Floods and Irrigation

The problem of irrigation in Bangladesh is that of too much water. Floods are an annual feature, and about 33 p.c. of the land is affected by them. Rangpur district is the worst sufferer on account of floods. Since cultivation is, in the main, rain-fed, modern methods of irrigation are almost absent. A few multi-purpose projects are being developed for reclamation, drainage, irrigation, navigation and generation of power. The Ganga-Kobadak project, when completed, will irrigate million acres in the districts of Khulna, Jessore and Kushtia. "The project involves the pumping of silt-laden Ganges water in to canals for irrigation, while the decadent Kobadak river is t be improved as a trunk drain, to be fed by a system of drainag channels, thereby controlling the amount and timing of wat remaining in the land and reducing the effects of floods. The Teesta barrage across the river Teesta will irirgate million acres of land. The Karnaphuli Project is intende to reduce floods in the Chittangong region, improve navig tion and supply water for irrigation.

Agriculture is the main occupation of more than 82 p.c. of the people of Bangladesh. About 64 p.c. of the total area is under cultivation. It is the leading raw jute producing country in the world, an important producer of tea from the point of view of world trade and a large producer of rice, sugar cane, gram, tobacco, fruits for domestic requirements.

Rice is the staple food for the people of Bangladesh. About 20 million acres of land are under rice cultivation and the annual production can be as high as 15 million tons. In 1969, the rice production was 11 million tons. The rainfall and soil of the country are ideal for rice cultivation. In every district of Bangladesh, rice accounts for more than 60 p.c. of the sown area. Rice is harvested three times a year—the autumn rice in August and September, winter rice in December and January and summer rice in March and April. The three crops are not raised in the same land as rotation is practised with jute. The highest yield per acre comes from the summer crops. The largest acreage however is covered by winter rice.

Although the monsoon discourages the cultivation of wheat in Bangladesh, about 90,000 tons are raised a year in the Rajshahi division. Sugar cane is cultivated in the districts of Dinajpur, Rajshahi, Dacca and Mymensingh. It hardly occupies 1 p.c. of the total cropped area, but as a crop it has always been important. The fact that the climate is too moist and that most of the cultivated areas are low-lying and frequently flooded, the cultivation of sugar cane is confined to areas where it can survive despite unfavourable conditions. The production of sugar cane in 1969 was 7 million tons. Tobacco is an important cash crop of Bangladesh. The tobacco-growing areas are Rangpur, Dacca and Mymensingh. Rangpur has about 60 p.c. of the total tobacco area of Bangladesh. The annual production of tobacco is about 180,000 tons.

Tea cultivation was started in Bangladesh in 1856 with Surma Valley as the centre. Its cultivation is continued today to Sylhet, Chittagong hill tracts and Tipperah where land elevation, soil and rainfall are highly favourable. About 88,000 acres of land are under tea cultivation in Bangladesh. The yield in 1969 was 26,000 tons.

Bangladesh exports normally 12 million lbs of tea annually. The best customer is U.K. Tea is mainly exported through Chittagong. As the export season for tea and jute are the same, there is always a great rush for loading at Chittagong. The shortage of tea chests is a serious problem of the industry in Bangladesh. Tea of Bangladesh does not command the prices obtained by Assam tea but it is valuable in blends.

Bangladesh has about 40,000 acres of land under *Short Staple raw cotton*. The cultivation is confined to Chittagong Hill Tracts.

Bangladesh holds a dominant position as a producer of raw jute. About 70 per cent of the total world production of raw jute comes from Bangladesh which has no rival in respect of colour, lustre and spinning qualities of jute. Jute crop occupies 1.7 million acres of land. The raw jute production in 1970 was 6.7 million bales.

The moist climate of Bangladesh is ideal for the growing of jute. The quality and quantity of fibres, however, depend on soils. Jute plant is grown in three different kinds of soil:— (a) the rich sandy loams of the highlands which produce the finest qualities of jute: (b) the Char lands, i.e., alluvial soils which are situated in the neighbourhood of the river tracts, and which are flooded during the rainy season—such lands do not require manure, (c) the marshes or low-lying tracts on the deltas of the rivers. The chief jute growing area is in the triangle formed by the Lower Ganges-Brahmaputra and Brahmaputra-Surma rivers.

The commercial division of the jute tracts in East Pakistan is as follow:—

1. Narayanganj
2. Serajgunj
3. Uttarya or Northern
4. Dewrah

'Narayaganj' jute is grown on the old Brahmaputra river valley in the districts of Mymensingh, Dacca and Triperah. There is no other jute tract in Bangladesh where water is so clear as that of the old Brahmaputra. Most of the tracts lie under flood water when the jute crop is still on the fields

and consequently, the fibre becomes 'rooty' and 'mossy'. Narayanganj jute is thus considered best in the market.

'Serajgunj' jute comes from the basin of the new Brahmaputra or Jamuna river in the districts of Pabna, Bogra, Rangpur and Western Mymensingh. The water of the Jamuna is nearly as clear as that of the old Brahmaputra.

'Uttarya' or northern jute is obtained from the highland tracts in the districts of Rajshahi, Bogra, Rangpur, Dinajpur and Malda. The areas are supplied with water from the tributary rivers of the Brahmaputra. As only a limited part of the tract receives a direct supply of water from the river, the jute is to be steeped and washed in ditch-water. The colour of the jute is inferior because the ditch-water which is used for successive steeping becomes coloured.

'Dewrah' jute is grown in tracts watered by the branches of the river Padma in Faridpur district. This is very strong but harsh and is suitable for making cordage and sackings.

Mymensingh alone raises more than 70 per cent of the raw jute of Bangladesh. The time for sowing is mid-February to mid-April and harvesting commences in mid-June and continues till early September. The average yield of jute per acre is 1,203 lbs. Jute cultivation is a very profitable occupation to the peasants who depend very much on it for their prosperity. Higher profits from jute cultivation made many cultivators to transfer their main interest from rice to jute. A few years ago, the policy of the former Government was to restrict jute-growing to reduce the food crop deficit.

U.K., India, France, West Germany and U.S.A. are the principal buyers of Bangladesh raw jute. In 1969, raw jute of Bangladesh gave an earning of Rs 62 crores from its export.

Of late, the country was giving incentive for the export of mesta to markets which are interested in cheaper lower grade jute. It may be noted that cheap mesta from Thailand has made considerable inroads into the traditional markets of Bangladesh raw jute.

Bangladesh grows oliseeds, more particularly rape-seed and linseed. About 68,000 acres of land are under linseed crop.

Problems in Agriculture

The monsoon climate, alluvial soil low-lying lands and large navigable rivers, provide the base for agricultural industry which is worked by people with age-old tradition and a government pledged to do everything for the improvement of the economy of the country. Nevertheless the agriculture of Bangladesh faces a number of problems—some are of long standing and others have their origin in the very recent developments. The amount of attention which the industry deserved in respect of credit and other facilities among cultivators was never given by the Pakistan government to any appreciable degree. Except for jute and tea which gave Pakistan the largest foreign exchange earnings, other crops because of their importance to East Bengal only did not have programmes or plans for sustained development. The consumption of fertiliser which is an important index of the pace of progress in agriculture was extremely low because of poor marketing of fertilisers. Even flood control measures were almost absent. The southern Ganges delta faces often the cyclonic tidal wave which destroys crops and cattle. Both the remedial and relief measures were most inadequate and indifferent. More recently, the devastation of the agricultural fields, destruction of the railway bridges and the general killings of people by the military rules of Pakistan over a period of nine months from March to December 1971 have created many serious problems for the new State. The procurement of food supplies from outside and the measures for bringing normalcy in agricultural sector are the two immediate problems.

Forests

The total area under forests is 8,558 sq. miles. There are three forest regions—(a) the forests along the eastern boundaries with main species like garjan and bamboos, (b) the sundarban tidal forests of Sundri and (c) the forests of the low-lying plains in Dacca and Mymensingh for Sal.

The major forest product in Bangladesh is timber, the annual output of which is about 15 m. cu. ft. Among minor forest products, Bangladesh produces 81 m. stems of bamboos, 800,000 canes, over 492,000 lbs. of honey and 120,000 lbs. of

wax a year. There are several species of timber which are yet to be exploited. The scope for utilizing less important wood species and other products like drugs, canes, bamboos and grasses is being seriously considered.

The principal trees which yield timber in Bangladesh are the following:

(i) Garjan used for boat-building and packing cases.
(ii) Gamari used for boats, buoys and packing cases.
(iii) Sundri
(iv) Bamboo is an important plant throughout the eastern parts and serves a number of uses. It grows abundantly in Noakhali, Comilla, Mymensingh, Sylhet and Chittagong. As the price of bamboo is very cheap, its use in villages has become common for framework, walls and roofs of houses.

Bangladesh is deficient in paper pulp and cellulose. It is, however, apparent that she is more or less self-sufficient in timber for furniture, agricultural implements and sports goods, etc. She is short of material for building and heavy construction, of railway sleepers and of timber for packing cases and tea chests. The over-exploitation of forests for fire wood and excessive grazing have pushed the forests into areas which are almost inaccessible. The previous Government formulated a forest policy to maintain and develop the supply of fuel and fodder, timber and other forest products. A Forest Research Laboratory at Chittagong was set up. The government of Bangladesh have decided to treat trees as perpetually renewable crops by encouraging both planting and felling on the principle of sustained yield.

Minerals

The geological surveys conducted so far do not give any indication of the presence of minerals except petroleum in Sylhet and Chittangong and in the Bay of Bengal. A few years ago, a pool of natural gas was discovered in Sylhet. The gas is of good quality and can meet the requirements of Bangladesh for at least 30 years. There is a pipe line from Sylhet to Dacca for Dacca—Narayanganj industrial area. Despite absence of minerals in Bangladesh, the requirements

for industrial purposes can be met by import of coal and iron ore from India. These two minerals can reach Bangladesh from West Bengal, Orissa and Madhya Pradesh. Bengal coal can be obtained by railways and river ways and the iron ore by cargo-vessels from Viskhapatnam. Already Visakhapatnam is an important centre where iron ore of Bailadila of Madhya Pradesh is collected for shipment to Japan. Both Chalna and Chittagong can arrange for cargo-vessel services with Visakhapatnam.

Mention may be made of the efforts for the development of the hydel power in Bangladesh. Although the river-systems in the country can be utilised for power and navigation, till now only one project is in progress.

The Karnafuli Project at Silchar contemplates harnessing the water of the river Karnafuli for the development of power. This Project will develop ultimately 160,000 kw. of energy. Chittagong, Chandpur and Comilla will be served from this source of power. In addition, the Project will provide navigation facilities up to the mouth of the Karnafuli, irrigation facilities to an area of 70,000 acres and control of floods. The present capacity of the Project is 80,000 kw.

Before the country acquired Independence in December 1971, the policy of the former government did not permit Bangladesh to take advantage of the nearness of Indian coal and iron ore for use in the country with the result that despite her vast resources in agriculture, little was done for the development of industries.

A new era for industrialisation is soon to begin now that the problems of fuel and iron ore are no longer beyond solution.

Fruit production

Bangladesh has more than 250,000 acres of land under fruits. The country is indeed very rich in mangoes, pine-apples and bananas. Mangoes are raised in abundance in Rajshahi, Bogra, Dinajpur and Rangpur. Bananas come from Dacca, Faridpur, Noakhali and Bakarganj. Excellent varieties of pine-apple are grown in Sylhet. Sylhet also produces oranges. The future of fruit production as an industry is very bright because of India as a market.

Livestock

Although the number of cattle is large in Bangladesh the quality is inferior in regard to milk and meat production. The grass has a deficiency in phosphorus and this makes cattle liable to disease.

In Bangladesh heavy rainfall does not encourage rearing of sheep and buffaloes. A few years ago, Bangladesh brought improved breeds of cattle from West Pakistan. Broadly, the lack of proper breeding, inadequate feeding and disease are the current problems, standing in the way of improving the live stock population of Bangladesh.

Fisheries

The Bangladesh fishing industry, while nationally not as important as agriculture from the standpoint of value of products and numbers of men employed, is, nevertheless, of vital importance to the national economy. About 400,000 people are in the fishing industry of Bangladesh.

Being bounded on the south by the Bay of Bengal and having numerous rivers, streams and bils, Bangladesh is preeminently a fish producing area. Fresh fisheries perform an important function by adding to the food supply. The annual output is normally far beyond the consuming capacity of the state and, therefore, can be exported to the Indian Union. Boats are extensively used for carrying fish to rail or steamer heads at Narayanganj, Chandpur and Goalundo. The important catches are rohu, hilsa, catla and prawns. Fish like kai, magur, singi and sal are abundant in ponds and bils. Government is taking a keen interest in the development of fisheries on modern scientific lines. Its rural pisciculture scheme has recovered many tanks and large bighas of water. Besides this, the Government has a scheme for the reclamation of derelict tanks and waterlogged areas for the purpose of using them for fish production.

The estimated annual production of fresh fish in Bangladesh is over 225,000 tons. About 70,000 tons of sea fish are also caught annually along a 300-mile coast-line. There is a plan to construct a fish harbour at Chittagong.

The main problem of the fishing industry is the inadequate facilities for handling, processing and marketing fish. Since fish can be a very important source of earning from external trade, the government is keen to remove the present handicaps as early as possible.

Manufactures

The present state of manufactures in Bangladesh is no indication of its future possibilities. The lack of minerals, the deliberate policy of the Pakistan Government to keep the state as a market for the products of the West Pakistan, the emphasis only on some agricultural products earning foreign exchange, the imbalance in the distribution of central revenue between the two wings of Pakistan and the apathetic attitude of the Government towards the development of technological education and training in the eastern wing were some of the causes for the meagre progress in industry. Nevertheless, few industries are in Bangladesh now which will form a base for future growth.

Jute Mills: Although Bangladesh had not a single jute mill in 1947 there are now eleven jute mills mostly located at Khulna, Chittagong and Narayangunj. In jute manufacture, the country is not only self-sufficient, but is also exporting. There are 29 jute mills.

Bangladesh has more than 7,000 looms with a total capacity of producing 3 lakh tons of jute goods per year. Production has already reached more than the level of 487,000 tons annually and the state has increased the installed capacity to 16,000 looms. About 50,000 people are employed in the jute industry. The Export Bonus scheme which operated till recently put the jute industry in a very favourable position vis-a-vis Indian jute in foreign markets.

Seventy per cent of the production of jute goods consist of sackings, while hessian and miscellaneous goods account for 25 and 5 per cent respectively.

The rise in the exports of hessian has been occasioned by the expansion in world demand for hessian. In the case of sacking, however, the industry has made heavy inroads into the traditional export markets of India.

Bangladesh ranks today second only to India as manufacturer of jute goods in the world, accounting for 15 p.c. of the world production. The rise in production is due to the fact that mills work two and a half shifts, thus making effective loomage to 22,000 from 8,726 looms. Since the internal demand has remained more or less the same, the volume of exports is on the increase.

Cotton Mills

In spite of the fact that Bangladesh suffers from inadequate supplies of raw cotton and power, the great progress in the cotton textiles was made possible because of the enormous demand for the products. The moist climate, extensive system of water transport and efficient labour are other additional advantageous factors. The mill centres are Khulna, Dacca, Bagerhat, Narayanganj and Kushtia.

A new cotton mill at Chittagong with 12,400 spindles started production two years ago. Bangladesh has 22 cotton mills.

Sugar Factories

The important centres are Rajshahi, Mymensingh, Dinajpur Jessore, Thakurgaon and Rangpur. Bangladesh can increase her sugar production if more areas in Mymensingh, Dinajpur and Rangpur are brought under sugar cane cultivation.

The main problems are the scattered nature of sugar cane areas and the difficulties in transporting the cane. There are now seven sugar factories.

Woollen Industry: There is only one woollen mill at Chittagong. *Match factories* are located at Dacca, Sylhet, Comilla, Rajshahi, Chittangong, Khulna and Bogra. Since match wood is available in plenty, further expansion will not be difficult. There are 18 match factories. *Cement* is produced at Chatak. *Paper* is manufactured at Kaptaimuk, near Chittagong with bamboo as raw materials. This mill is known as the Karnafuli Paper Mills. There is also a newsprint mill at Khulna. The other industries are aluminium works, glass works and a fertiliser factory.

Transport

Bangladesh has means of communication by rail, road, rivers and air. With 1,708 miles of line, there are two distinct system of railway—broad gauge and metre gauge in Bangladesh. The Brahmaputra divides the country into two parts. On the right bank of the river the railway consists of broad gauge track, which is mostly single-line, and a relatively small mileage of single-line metre gauge. On the left bank of the river the country is served by a metre gauge single-line track with Chittagong as the terminus. There is no direct connection between the two systems except by river transport. Though tea and jute are mostly carried by boats and steamers, the railways have to handle a large volume of traffic in other commodities. The main railway lines run from Chittagong in metre gauge: (a) Sylhet via Laksam, Comilla, Narayanpur and Kulaura; from Laksam, there is a branch line to Chandpur; (b) to Baharurabad via Narayanganj and Mymensingh. Mymensingh is connected by a line with Dacca. There is now much congestion of traffic in the line between Chittagong and Bhairab Bazar. Now that most of the trade passes through Chittagong, there is a proposal to double the line along the system to cope with the increased and increasing traffic. Poradah is an important railway junction of the broad gauge lines. From here lines go to (a) Serajgunj on the Jumna in Pabna; (b) Rajbari on the Padma and thence to Faridpur; (c) Domar via Iswardi and thence to Darjeeling.

Since Bangladesh railways have links with Indian railways, and since the traffic restrictions will not hinder the movements, it is expected that Bangladesh railways will acquire more importance to her economy.

Road communications are difficult in Bangladesh because of rainfall and the existence of numerous rivers. It has been estimated that for every one mile of road as many as fifty minor bridges are to be constructed. There are no trunk roads in Bangladesh

In Bangladesh river navigation with about 3,000 miles of route occupies a very important place. There is no other region in the world which has so many navigable rivers, distributaries, channels and creeks as in Bangladesh. The transport

of goods and passengers by water is the principal means of communication. About 75 per cent of the total traffic is handled by waterways.

The chief rivers are the Padma, the Brahmaputra and the Meghna. The Padma is really the continuation of the Ganga. It flows towards the south-east from the Murshidabad-Maldah districts through Rajshahi, Pabna, Faridpur and Dacca. The Ganga divides itself into two parts near Maldah, one part flowing towards the south as the Bhagirathi and the other towards the south-east as the Padama. The Brahmaputra from Assam enters Bangladesh in Rangpur and flows towards the south and joins the Padma near Faridpur. The Meghna, known as the Surma in Sylhet, meets the Padma near Chandpur.

Regular steamer services are maintained between (a) Chandpur and Narayaganj; (b) Goalundo and Chandpur; (c) Goalundo and Narayangnj; (d) Dacca and Barisal; (e) Barisal and Lohajang. These services are essential not only for passengers but also for the movement of jute and rice.

There is, however, one difficulty in transporting goods by water between the interior parts of Bangladesh and the port of Chittagong. The river steamers cannot cross open water in the Bay of Bengal.

Civil Aviation

There are air services between towns in Bangladesh. Dacca Airport which is of the international standard is the main centre from where the routes are maintained. Chittagong is also an international airport.

Ports

Chittagong is an important outlet for the produce of Bangladesh. It is situated at a distance of 11 miles from the mouth of the Karnafuli river. The problem of silting in the Karnafuli is being tackled. The chief article of export is tea. The other exports are jute, hides and skins, rice and raw cotton. The imports are chemicals, machinery, metal, salt, cotton goods and sundry instruments.

During the last three years there has been a steady increase in the handling capacity of Chittagong. Capacity has now been raised to about 5 million tons.

There are schemes for the development of the port in respect of harbour equipment and accommodation which will further increase its capacity to 5,000,000 tons. The development of Chittagong port was given very high priority in the Pakistan Government's six-year plan because of the importance of the country to Pakistan as a market.

Side by side with the development of Chittagong port, another port has been opened at Chalna (district Khulna) on the river Pusoar, an inland port to handle ocean-going vessels. The location of the new port is about 80 miles from the sea and 2 miles from Chalna. This port has relieved both the Chittagong port and the Railways of pressure of traffic. It handles outgoing jute and tea and incoming coal and food-grains. The port handles about 2.5 million tons of cargo.

The other minor ports of Bangladesh are Cox's Bazar and Noakhali.

Trade Centres

The important towns are Dacca, Narayanganj, Mymensingh, Faridpur, Rangpur, Sylhet and Chandpur.

Dacca is the capital of Bangladesh. It is situated on the Buriganga, a loop of the Dhaleswari, and extends along the bank of the river for about 4 miles. During the 17th century, it was the Mohammedan capital of Bengal and it lost its importance in 1704 when the capital was shifted to Murshidabad. Dacca is famous for shell bangles and for gold and silver craft. It is the most important inland trade centre. It is situated in the heart of the jute growing districts. Narayanganj is practically the port of Dacca. It is situated on the Lakhya river, a little above its junction with the Dhaleswari. It is a great jute emporium and has steamer services with Goadundo and Sylhet. It has a population of about 65,000. Sylhet, on the Surma river, is important for fruit and lime. The other centres are Faridpur, Mymensingh, Barisal and Noakhali.

Foreign Trade

The loss of West Pakistan as a market will not affect the economy of the country adversely. The primary commodities which were imported by West Pakistan consisted of betelnuts

spices, wool and timber, and their value in 1969-70 was Rs. 16 crores. The manufactured goods were Tea, jute goods, paper and paper board, matches and leather. The value of manufactured goods exported to West Pakistan was Rs 75 crores in 1969-70.

The value of total exports to Pakistan in 1969-70 was Rs. 92 crores against the value of imports of Rs 167 crores.*

*(Source: Hindustan Times, Delhi 30th March, 1972)

Composition Of Exports From Pakistan To Bangladesh

Commodity	1968-69	1969-70 (Crores of rupees)
PAKISTAN MERCHANDISE:		
(a) Primary commodities		
Oilseeds	11.50	12.46
Raw cotton	15.78	16.61
Tobacco	10.14	10.31
Food grains	14.92	35.69
All other commodities	10.38	14.73
Total	62.72	80.30
(b) Manufactured goods.		
Cotton fabrics	21.72	24.23
Cotton yarn & thread	6.12	8.68
Machinery	6.64	6.57
Drugs & Medicines	5.38	5.39
Tobacco manufactures	2.22	4.19
Metal manufactures	1.88	1.93
Rape & mustard oil	0.74	0.40
Rubber goods	1.45	2.27
Paper and paper board	2.61	2.99
Vegetable oil non-essential	0.39	0.40
Cement	7.02	4.89
All other commodities	15.37	13.53
	71.53	75.42
Total (a plus b)	134.25	165.22
Foreign Merchandise	4.29	1.47
Grand Total	138.54	166.69

Composition Of Exports From Bangladesh To Pakistan

	1968-69	(Crores of rupees)
BANGLADESH MERCHANDISE:		
(a) Primary commodities		
Betelnuts	0.85	0.12
Spices	0.98	0.90
Wood and timber	1.17	1.18
Others	7.81	14.05
Total	10.84	16.24
(b) Manufactured goods:		
Tea	25.71	24.33
Jute goods	15.83	15.92
Paper and paper board	10.96	10.91
Matches	4.27	4.48
Leather	2.96	2.81
Other articles	16.27	16.92
Total	76.00	75.37
Total (a plus b)	86.85	91.61
Foreign Merchandise	0.28	0.73
Grand Total	87.13	92.37

Raw jute, manufactured jute and tea are the principal items of export. The important buyers are U.K., Belgium, U.S.A., India and France. The imports are iron manufactures, chemicals, food, petroleum and machinery.

Present Problems

Financial assistance for rehabilitation programmes, food supplies till the food position improves, technical assistance for transport and other industries, restoration of law and order and creation of jobs immediately for thousands of young persons are some of the more pressing needs of the state. The banks and the financial insitutions have been completely denuded of cash and gold by the military rulers. The people have nothing except determination to bring back the country to a normal state. For nine months, agricultural operations could not be performed. Godowns and store houses were looted. The railway lines and the bridges which are so vital for the economy of the country are also destroyed. The liquidation of the intellectuals by the military rulers has posed a problem of actue shortage of technical and scientific personnel

Some fanatics dreaming still of one Pakistan are engaged in anti-social work in scattered and remote places to disturb the early return to normal life. Thousands of persons who were hitherto busy in the liberation struggle are in need of jobs.

Despite the attitude of a few countries in not seeing the realities in Bangladesh, there is a world-wide sympathy and understanding of the problems of the new state. Aids in terms of money, food and equipment are steadily flowing in for the new state. Trade agreements are being entered into with many countries. For the present Bangladesh has a most difficult time, but the country is destined to come out of the ordeal in no time because of the ethos of the people, ideologies of the government, co-operation of friendly countries* and above all, the natural resources of the land.

*U.K. has agreed to give £4.8 million interest-free commodity loans to Bangladesh. The proceeds of the loan will be used for importing goods and services from Britain. The repayment period for the loans

QUESTIONS

1. Write a short account of the transport systems of Bangladesh so as to emphasise their importance in the country.

2. Describe the principal exports and imports of Chittagong.

3. Examine the present position and the future prospects of the following industries in Bangladesh: (*a*) Sugar industry; (*b*) Cotton mill industry; (*c*) Jute mill industry.

4. To what extent are conditions favourable for the development of manufacturing industries in Bangladesh ?

is 25 years. Earlier, India had entered into treaties with Bangladesh for friendship and co-operation in economic fields. Very recently Bangladesh and Burma have signed an agreement under which Bangladesh could export jute goods and newsprint valued at Rs. 4.4 crores to Burma. The Trading Corporation of Bangladesh will take charge of the export.

The Soviet Union and Bangladesh have finalised a barter agreement for trade of the value of 100 million rupees. It was decided that Balgladesh will export to the Soviet Union jute goods worth 25 million rupees, 20,000 tons of raw jute, 200 tons of tea and other goods worth Rs 500,000. Bangladesh will import machinery and equipment, iron billets, 20,000 tons of pig iron, 20,000 tons of kerosene and 6.000 tons of raw cotton from the Soviet Union.

CHAPTER XIX

BURMA

Burma has an area of 678,000 sq. km with a population of more than 27.7 millions. The average density of population in Burma is 50 per sq. km. In fact, Burma's density is lower than that of all other countries of South-East Asia. The highest densities in Burma are confined to the divisions of Pegu, Irrawady and Mandalaya. Absence of large cities and the low proportion of flat and well-wartered land are responsible for the low density in Burma.

The prevailing religion is Buddhism, which is professed by about 85 per cent of the population. The indigenous races of Burma are mainly of the Mongolian stock. There are three main divisions; (*i*) the Tibeto-Burman, (*ii*) the Mon-Khm-r and (*iii*) the Tei-Chinese. They are more or less distantly related and connected; although bitter at times, the assimilation and transformation of these races into a united nation has been steadily progressing for centuries.

It is a country of mountains and valleys. Northern Burma is a land of steep, lofty mountains and narrow valleys, all covered by forests. As the main ranges of mountains run from north to south, the communication between east and west is generally difficult. These mountain ranges become lower as they come south. Hence the transport conditions are better in the south. The valleys of the Irrawady and the Sittang comprise level lands of which alluvial soils have extended to the extreme south along the coast of the tail of Burma.

The greater part of Burma being within the tropics, the climate is hot and damp. The delta and coastal areas are always very wet. There are three seasons in Upper Burma, cold, hot and wet; but scarcely more than two in Lower Burma, wet and dry, both of them hot. The central districts of Upper Burma are dry. The areas are protected from the south-west monsoon by the Arakan Yomas. This is only part of Burma where famine can occur.

Burma is an important source of many mineral products, like petroleum, lead, zinc, tin, tungsten, nickel and cobalt.

Lead occurs in the eastern part of Burma, the Mergui district, the Putao district and the southernmost and northernmost extremities of Burma. The Bawdwin mine contains the largest and the richest deposit of lead. For many years Burma was the largest producer of tungsten mineral in the world. The production in 1970 was 246 tons. The tungsten deposits are widely distributed in Tennasserim area in the south and extend towards the north in Kyankse district. The country, however, has not so far developed important industries based on minerals, except for the petroleum refining industry. The oil-fields of Burma are confined to the valley of Chindwin and the Lower Irrawady. The main oil-fields lie at Yenangyaung in Central Burma, and there is a pipe-line running to Rangoon. Another field of considerable importance is at Chauk in the Magwe district. Output of crude oil is now about 1 million tons a year. Rich deposits of tin are found in Tennasserim. Bawdwin contains one of the largest deposits of silver in the world and produced in 1970 about 740,000 oz. Coal is found in the Chindwin valley where jade and amber mines are also worked. With the exception of a small output for a very limited period, from the Namma area in the Northern Shan States and from the Kabwet coalfields in the Shwebo district, there has been production of coal in Burma. Burma, however, has reserves of tertiary coal in Chindwin, Mergui, Myitkyina and Shan States. All the tertiary coals of Burma are of the lignite type, and they disintegrate into small fragments on exposure to air. For this reason the indigenous coal is not yet important. The other minor minerals are rubies and wolfram, antimony and salt. Exports of minerals are approximately equal to their production.

The forests of Burma cover nearly 60 per cent of the total area of the country. There are six types of forests in Burma:

I. Tidal forests along the Arakan and Tenasserim coasts.

II. Beach and dune forests above the high-tide limits of the Arakan and Tenasserim coast.

III. Tropical evergreen forests, where rainfall is over 120 inches. Bamboo is the typical one.

VI. Mixed decidious forests where the rainfall is 40 to 120 inches. Teak and Padauk are the chief types in Upper Burma.

V. Dry forests on the edge of the Dry Zone are a source of tanning materials.

VI. Sub-tropical and temperate forests are found on heights over 3,000 feet with pines, oaks, fern and chestnuts.

Teak has always been the most valuable tree commercially, while *bamboo* is probably the most useful forest product from the point of view of the people. Teak is found in the Pegu Yomas and the eastern slopes of the Arakan Yomas and also on the Thailand border. The teak trees are dragged by trained elephants from the forest to a river to be floated down to the Delta ports. In recent years about 75 per cent of the world's teak has come from Burma. Teak is unsually strong, durable and resistant to fungus. The other sources of timber are padauk, match wood and pyinkado, the production of which is 55,000 tons a year. Except teak, other timbers are not exported. Bamboo is put to several uses in Burma—as household utensils, weapons, funiture, for making rafts and water conduits.

Burma has not so far developed paper industry even though timbers of appropriate kinds are available. Partly because her manufacturing industries are young and partly because the exports of raw materials predominate in her economic activity, Burma has not yet directed her attention to the utilization of her products for the development of industries.

Burma is essentially an agricultural land. Nearly 71 per cent of the population are engaged in agriculture and forestry. Agriculture occupies about 20 million acres of land. Burma produces more than 8 million tons of rice annually. The heavy rainfall of Burma is peculiarly suited to rice which covers about four-sixths of the cultivated area. The Upper and Lower Irrawady valleys, the narrow coastal region on the west and upper Tenasserim utilise more than 80 per cent of their cultivated land for rice. Maize is cultivated in the central valley of the Irrawady. Sugarcane is cultivated in more than 20,000 acres of land in the Upper Irrawady region. The Northern Shan States raise tea. Although *tobacco* is cultivated throughout the

country, the western regions are more important, particularly the Arakan hill tracts. Other crops are cotton and oil-seeds.

Waterways form the most important means of communication in Burma. All the three rivers of Burma flow nearly due south through narrow valleys. They have few tributaries, and yet they never run dry and are full and deep for most part of the year. The river *Irrawady* traverses the whole length of Upper and Lower Burma and is navigable from Rangoon for nearly 14,000 km to Bhamo. It is the most important outlet in the heart of Burma and the chief cities of the country are situated on its bank. *The Salween,* though longer than Irrawady is navigable only for 120 km from its mouth. It is much interrupted by rocks and rapids. It has no delta. The river *Sittang* is not important as it is blocked by banks. Except in the monsoon, the river cannot be used for navigation.

The railways are all metre gauge and start from Rangoon. In 1968 Burma's railway was 4300 km. The main line of the railway follows the Sittang Valley from Rangoon to Mandalay through Pegu. Another main line runs from Rangoon to Prome along the valley of the Irrawady. The branch lines are follows: (*i*) Pegu to Martaban with a ferry across the river to Moulmein; (*ii*) Moulmein to Ye and from Ye to Burma-Siam line; (*iii*) Mandalay to Lashio; (*iv*) Mandalay to Myitkyina; (*v*) Henzada (on the Prome route) to Bassein.

There are only 15,000 km. of roads, of which 5,200 km. are motorable. The principal roads are: (*i*) the Burma Road, (*ii*) the Rangoon-Prome-Yenangyaung-Meiktila, (*iii*) Myingyan-Meiktila-Taunggyi-Siam, (*iv*) Sagaing-Shavebo-Kalewa-Imphal, (*v*) the Stilwell Road, (*vi*) Pegu-Thaton-Moulmein-Tavoy and Margin. The *Burma Road* runs from Rangoon to Kunming, *via* Pegu, Mandalay, Maymyo, Lashio and Wanting. This route is open in all weathers throughout the entire length. The *Stilwell Road* runs from the Assam rail head at *Ledo* to Bhamo *via* Myitkyina. From Bhamo there is a road to connect it with the Burma Road through Namkham. The Stilwell Road was built for military purposes, although it passes through rich agricultural lands of Hukakang Valley.

There are only a few cities in Burma, most of which are modern. These cities are either sea-ports or river-ports. The principal trade centres are Akyab, Bassein, Tavoy, Moulmein,

Mandalay, Bhamo and Rangoon. *Bhamo,* in Upper Burma, does considerable frontier trade with China. It is 300 km. above Mandalay. It owes its importance to its position. It is the terminus for the steamer traffic and is only 30 km. from China's frontier. *Akyab,* on the western coast of Burma, is an important rice-exporting centre. Its great drawback is that it has no railway communication. It is now the third port of Burma and the centre of trade of the fertile rice-bearing Arakan coastal strip. The principal imports are liquor, machinery, textiles and hardware. *Bassein,* on the south-west of the Irrawady Division, is situated at a distance of nearly 110 km. from the sea. It has direct railway communication with Rangoon. *Rangoon,* the chief port of Burma, is the capital of the country. It is situated on the Rangoon river and is about 40 km. from the sea. It owes its growth and importance almost entirely to its situation. It is the sea-outlet for the great delta and river-basin of the Irrawady. About 90 per cent of the foreign trade of Burma is handled by Rangoon. The principal imports are cotton manufactures, metals, provisions, silk, sugar, leather goods, machinery, paper, etc. The chief exports consist of rice, hides and skins, zinc, lead, timber, mineral oils, tobacco and rubber. It is connected by railways with the most important towns of the country. *Moulmein,* on the Gulf of Martaban, is a large port. It is connected by railways with Rangoon. From a mere fishing village in 1824, it has now become the second seaport of Burma. The opening of the railway line has increased its importance, and much of the former import traffic of Rangoon is today handled by Moulmein. The chief imports are steel, sugar, provisions and gunny bags; while the exports consist of timber, rubber, tin ore and tobacco. It is also the great teak port of Burma. Rafts of timber from wooded hills are allowed to float down the Salween up to Moulmein. *Tavoy* is situated in the centre of the tail of Burma and is an important port. Wolfram and tin are the principal exports. *Mergui,* on the south-west coast of Tennasserim, is the centre of rubber and pearl-fishing industries. *Mandalay,* in Upper Burma, is situated on the Irrawady river, about 600 km. north of Rangoon. Mandalay is favoured by its position in the broadest part of the Irrawady valley and at the head of the valley of the Sittang. Rice and silk are the articles of trade in the city.

The foreign trade is handled by the Government trading organisations. Two-thirds to three-fourths of Burma's total exports consist of rice and petroleum; 90 per cent of the exports pass through Rangoon.

In the matter of imports, Burma takes manufactured commodities, consumer goods and some iron and steel, coal and coke and machinery.

Burma imports from India cotton piece-goods, twist and yarn, jute, betelnut, pulses, wheat, iron and steel, cigarettes, tea, boots and shoes, fruits; and, from abroad, cotton goods, machinery, iron and steel, chemicals, etc. Burma sends to India rice, pulses, gram, oil, sandals, tin, wood and timber. A new field in which India has been trying to increase the export is engineering goods. Bicycles, electric fans, radio parts, gramophone records and pharmaceutical products are being imported in large quanitities from India.

the north-east coast, is a port of minor importance. *Jaffna*, on the north, is an important town. *Kandy*, in the central highland, is the old capital.

QUESTIONS

1. Explain the following, giving reasons:
 (*a*) Burma, though rich in forests, has no paper industry.
 (*b*) Ceylon receives rainfall both in summer and winter.
 (Indian Institute of Bankers, 1967).

2. Write short notes on: (a) Communications in Burma, and (b) Tea exports of Ceylon. (Indian Institute of Bankers 1968).

3. Discuss the posibilities of industrial development in Burma.
 (Cal. B. Com., 1951).

4. Write notes on the following: (*a*) Communications in Burma, (*b*) economic significance of Burma's forests, and (*c*) Mandalay.
 (Indian Institute of Bankers, 1962).

5. Write a short note on India's trade with Ceylon.
 (Indian Institute of Bankers, 1967).

NEPAL

Nepal, an independent kingdom with its area of 141,000 sq. km. and 11.2 million population, occupies a location of great commercial and strategic importance in view of its frontiers touching Tibet on the north, West Bengal and Sikkim on the east, Bihar and Uttar Pradesh on the south, and U.P. on the west. Nepal presents three distinct natural regions: The Terai, the mid-Terai and the mountain area. The Terai is an extension of the Gangetic plain. The mid-Terai located on the north of the Terai is a region of hills, swamps and forests. There are a number of board valleys in the mid-Terai. Still higher, the area is mountainous and covers about two-thirds of the country. The three large rivers of the country are the Gogra, the Sapt Gandaki and the Sapt Kosi.

About one-third of the country is covered by forests. The southern part of Nepal supplies timber and other forest products, and the northern part is noted for medicinal herbs. Agriculture which is the occupation of the 95 per cent of population is practised in the valleys and plains, and the important crops are rice, maize, millet and wheat. About 90 per cent of the cropped area is under rice cultivation. The other crops are jute, oilseeds, and sugar-cane.

The livestock includes cows, buffaloes, sheep and goats, and its products are ghee, hides and skin and wool.

The numerous streams and the mountainous character of the relief hold out great possibilities of hydroelectric development. Already, three plants—one in Morang and two in the valley of Kathmandu—are in operation.

Jute mills, sugar mills, glass, ceramic, paper, cement and match industries are being developed. Biratnagar and Birganj are the two important manufacturing centres.

The two serious problems of the country are inadequate transportation and the difficulties of transit trade. Although there are about 800 km. of motorable roads, the mid-Terai and the mountainous area are still in most places without roads. A

highway of 1,300 km. from east to west along southern Nepal is being constructed in co-operation with India and U.S.A. The only railway line is confined to Terai and connects Raxaul on the Indian border with Amlekganj, and Jayanagar with Janakpur. Air transportation is growing in importance, and already Kathmandu has been linked by air with 11 districts of Nepal. Kathmandu maintains air services with Patna, Calcutta, Dacca and New Delhi. The problems of trade are being solved by treaties with India.

The principal exports of Nepal are foodgrains, jute, timber, oilseeds, ghee, medicinal herbs, and skins and cattle. The main imports are textiles, machinery, tea, steel, cement and salt.